



# **Water and Sediment Quality in the Yukon River Basin, Alaska, During Water Year 2003**



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Cover photograph: Yukon River at Eagle, Alaska, just after ice breakup.



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Edited By Paul F. Schuster

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**U.S. Department of the Interior**  
**U.S. Geological Survey**

**U.S. Department of the Interior**

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**U.S. Geological Survey**

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## Conversion Factors

<b>Multiply</b>	<b>by</b>	<b>To obtain</b>
<u>Length</u>		
nanometer (nm)	$3.937 \times 10^{-8}$	inch
micrometer ( $\mu\text{m}$ )	$3.937 \times 10^{-5}$	inch
millimeter (mm)	$3.937 \times 10^{-2}$	inch
centimeter (cm)	$3.937 \times 10^{-1}$	inch
meter (m)	3.281	foot (ft)
<u>Area</u>		
square kilometer ( $\text{km}^2$ )	$3.861 \times 10^{-1}$	square mile
<u>Flow</u>		
cubic meter per second ( $\text{m}^3/\text{s}$ )	35.31	cubic foot per second ( $\text{ft}^3/\text{s}$ )
<u>Volume</u>		
microliter ( $\mu\text{L}$ )	$3.382 \times 10^{-5}$	once, fluid
milliliter (mL)	$3.382 \times 10^{-2}$	once, fluid
liter (L)	$2.642 \times 10^{-1}$	gallon
<u>Mass</u>		
microgram ( $\mu\text{g}$ )	$3.527 \times 10^{-8}$	ounce, avoirdupois
<u>milligram (mg)</u>	<u><math>3.527 \times 10^{-5}</math></u>	<u>ounce, avoirdupois</u>

Degree Celsius ( $^{\circ}\text{C}$ ) may be converted to degree Fahrenheit ( $^{\circ}\text{F}$ ) by using the following equation:

$$\text{F} = 1.8 (^{\circ}\text{C}) + 32$$

Vertical coordinate information is referenced to the North American Vertical Datum of 1988 (NAVD 88)

Water year is the 12-month period October 1 through September 30 and is designated by the calendar year in which it ends.

Horizontal coordinate information is referenced to the North American Datum of 1983 (NAD 83)



# **Water and Sediment Quality in the Yukon River Basin, Alaska, During Water Year 2003**

Edited by Paul F. Schuster

## **Overview**

This report contains water-quality and sediment-quality data from samples collected in the Yukon River basin from March through September during the 2003 water year (WY). Samples were collected throughout the year at five stations in the basin (three on the main stem Yukon River, one each on the Tanana and Porcupine Rivers). A broad range of physical, chemical, and biological analyses are presented.

## **Acknowledgments**

The USGS Nation Stream Quality Accounting Network (NASQAN) and the National Research Program would like to thank the USGS Alaska Science Center, Water Discipline, in Anchorage and the Field office in Fairbanks. Without their field expertise and continuous logistical support this work would not have been possible. A.M. Shiller's participation was partly supported by the National Science Foundation (EAR-0001049).

# **CHAPTER 1 - Introduction**

*by Paul F. Schuster*

The U.S. Geological Survey (USGS) National Stream Quality Accounting Network (NASQAN) is conducting a 5-year (2001-2005) study of the water quality of the Yukon River Basin (330,000 square miles) from the Yukon River headwaters in Canada to the Bering Sea (Nelson and others, 2001). Climatic warming of the Yukon River Basin is resulting in lengthening of the growing season, melting of permafrost, and deepening of the soil active layer (Osterkamp, 2003; Miller and others, 2003; BESIS, 1997). These and related processes are anticipated to result in changes in water and sediment chemistry and discharge in upcoming decades. As a first step in understanding these changes, measurements of water discharge and water and sediment chemistry are being made on the upper, middle, and lower Yukon River and on the Tanana and Porcupine Rivers (Schuster, 2003).

A thorough description of the basin is given in Brabets and others (2000). Schuster (2003) describes the objectives and approach of the study and provides a brief description of the basin (fig. 1). Sediment load and concentrations, and a broad range of constituents were measured in fixed station samples during Water Year (WY) 2003, including major ions, nutrients, dissolved and sediment-associated trace elements, biological indicators (such as dissolved oxygen) and the stable isotopic composition of nitrogen, carbon, and sulfur of particulate organic matter, and various forms of organic carbon. Because of its extensive wetlands, the Yukon River exhibits high organic carbon concentrations in contrast to other large rivers. Both the chemical composition and concentration of organic carbon are expected to change with melting permafrost. In addition to this work, intensive sampling campaigns of the entire reach of the Yukon River from headwaters at Atlin Lake, British Columbia, to Pilot Station, Alaska, during high flow in early June and low flow in late August were

completed during the years 2002-2004. The intensive sampling will address process-based questions about the water quality of the basin.

The purpose of this report is to compile and report the water-quality and sediment-quality data collected during WY 2003. The sample-collection methods and the laboratory analytical methods are described in Schuster (2003). Because many of the results are research-oriented, they are not contained in the USGS National Water Information System (NWIS) database and would, otherwise, be available to the public upon request. This report, the third in a series of annual reports for the 5-year study, is being released both in paper and electronic format to meet both archival and data dissemination objectives.

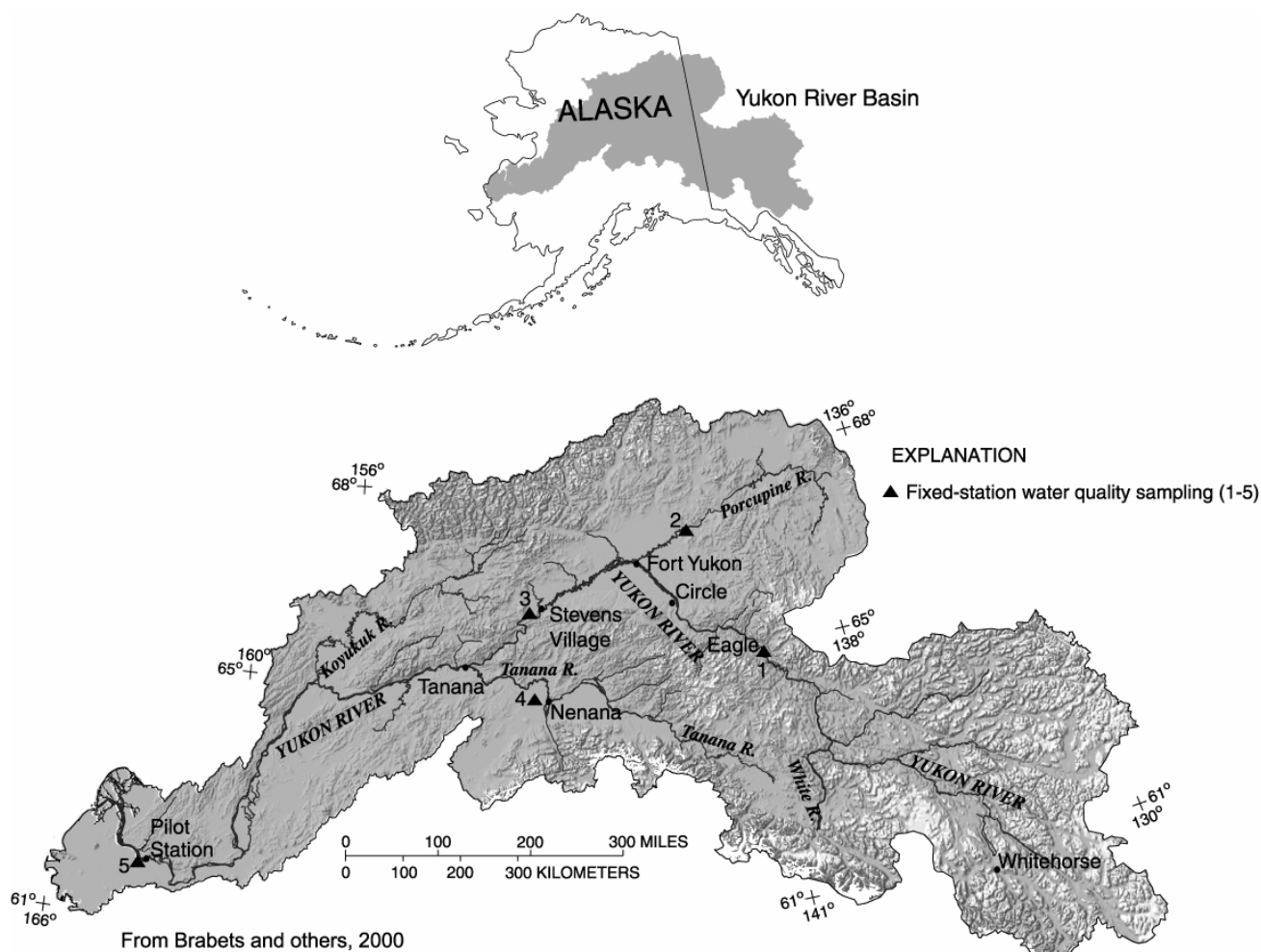


Figure 1. Map showing location of fixed-station water-quality sampling sites in the Yukon River Basin

## CHAPTER 2 - Fixed-Station Samples

*by Timothy P. Brabets*

The following section provides a summary of the site characteristics (table 1). References for the description of sample collection and processing of samples for various water quality constituents are given in Schuster (2003). Sample analysis results for field measurements, major ions, nutrients, organic and inorganic carbon, trace elements, suspended sediment concentrations, and trace elements in suspended sediments during WY 2003 are given in tables 2-6. The data provided in this section also are available from the USGS NWIS database (<http://waterdata.usgs.gov/nwis/>).

**Table 1.** Summary of site characteristics at five fixed stations in the Yukon River Basin

[Station ID, USGS station identification number, stream flow and water-quality measurements collected at the same station; ID on figure 1, refer to figure 1 for station ID locations; sq.mi., square miles; NAD 83, North American Datum of 1983; NAVD 88, North American Vertical Datum of 1988]

Station ID	ID on Figure 1	Station Name	Latitude (NAD 83)	Longitude (NAD 83)	Drainage Area (sq. mi.)	Datum (feet above NAVD88)
15356000	1	Yukon River at Eagle, Alaska	64°47'21"	141°12'00"	113,500	850
15389000	2	Porcupine River near Fort Yukon, Alaska	66°59'25"	143°08'26"	29,500	520
15453500	3	Yukon River near Stevens Village, Alaska	65°52'30"	149°43'13"	196,300	240
15515500	4	Tanana River at Nenana, Alaska	64°33'53"	149°05'39"	25,600	338.5
15565447	5	Yukon River at Pilot Station, Alaska	61°56'01"	162°52'59"	321,000	20

**Table 2.** USGS National Water Quality Laboratory analyses- Yukon River at Eagle, Alaska

[Station ID, refer to table 1 for description and figure 1 for location; ft<sup>3</sup>/s, cubic feet per second; mg/L, milligram per liter; NTU, Nephelometric turbidity unit; <, less than detection limit; --, missing value; mm, millimeter; lab, laboratory; fld, field; µS/cm, microsiemen per centimeter at 25 degrees Celsius; cm, centimeter; C, Celsius; UV, Ultraviolet; nm, nanometer; Flt, filtered; NO<sub>3</sub>, nitrate; wat flt susp., water filtered suspended; µg/L, microgram per liter; Dis fet lab, dissolved fixed end-point titration in laboratory; Dis tot IT, dissolved total incremental titration; Dis IT field, dissolved incremental titration in the field; %, percent; E, estimated; M, presence of material verified but not quantified; major ion, phosphorous, orthophosphorous, and trace element analyses are dissolved]

Station ID	Date/Time	Discharge (ft <sup>3</sup> /s)	Solids, Residue at 180° C, Dissolved (mg/L)	Turbidity Lab Hach (NTU)	Barometric Pressure (mm of Hg)	Oxygen, dissolved (mg/L)	pH, Field (Standard Units)	pH, Lab (Standard Units)
15356000	4/1/03 10:50	18,500	158	1.1	752	10.4	7.7	7.6
15356000	5/23/03 17:40	84,500	137	31	739	13.5	7.6	7.7
15356000	6/17/03 12:20	163,000	127	130	748	9.5	8.1	E7.3
15356000	7/17/03 13:00	163,000	133	540	732	8.6	8.2	7.8
15356000	8/13/03 13:00	106,000	147	220	747	9.9	8.2	8.1
15356000	9/9/03 14:30	113,000	147	40	744	10.7	7.8	8.0
15356000	9/24/03 12:30	82,300	141	9.9	735	12.0	8.4	E7.7

Station ID	Date/Time	Specific Conductance, Lab (µS/cm)	Specific Conductance Fld (µS/cm)	Air Temp (°C)	Water Temp. (°C)	UV Absorbance 254 nm, Flt (units/cm)	UV Absorbance 280 nm, Flt (units/cm)	Calcium (mg/L)	Magnesium (mg/L)
15356000	4/1/03 10:50	265	265	-10.0	0.0	0.032	0.023	36.7	9.96
15356000	5/23/03 17:40	201	210	--	8.8	0.321	0.241	26.0	7.79
15356000	6/17/03 12:20	213	209	23.4	13.7	0.106	0.078	28.3	8.69
15356000	7/17/03 13:00	221	224	25.5	16.6	0.079	0.058	29.0	8.38
15356000	8/13/03 13:00	232	240	--	15.4	0.060	0.043	32.2	8.88
15356000	9/9/03 14:30	243	234	7.2	10.4	0.084	0.060	32.2	10.5
15356000	9/24/03 12:30	241	240	--	2.9	0.055	0.038	33.6	10.7

**Table 2.** USGS National Water Quality Laboratory analyses- Yukon River at Eagle, Alaska-continued

Station ID	Date/Time	Potassium (mg/L)	Sodium (mg/L)	Alkalinity, Dis lab, as CaCO3 (mg/L)	Alkalinity, Dis tot IT, Field (mg/L)	Bicarbonate, Dis IT Field (mg/L)	Carbonate, Dis IT, Field (mg/L)
15356000	4/1/03 10:50	1.15	2.85	106	92	113	0
15356000	5/23/03 17:40	1.05	2.29	74	72	88	0
15356000	6/17/03 12:20	0.95	2.02	72	69	84	0
15356000	7/17/03 13:00	1.64	2.88	81	78	95	0
15356000	8/13/03 13:00	1.51	3.16	85	82	100	0
15356000	9/9/03 14:30	1.02	2.45	86	82	100	0
15356000	9/24/03 12:30	1.09	2.52	88	86	105	0

Station ID	Date/Time	Chloride (mg/L)	Fluoride (mg/L)	Silica (mg/L)	Sulfate (mg/L)	Nitrogen, Ammonia dissolved (mg/L)	Nitrogen, Ammonia + Organic, dissolved (mg/L)	Nitrogen, Ammonia + Organic Total (mg/L)
15356000	4/1/03 10:50	0.22	0.12	6.92	33.3	<0.015	E0.07	E0.06
15356000	5/23/03 17:40	0.53	<0.2	5.51	29.6	<0.015	0.26	0.28
15356000	6/17/03 12:20	0.75	<0.2	5.64	33.5	<0.015	E0.10	0.47
15356000	7/17/03 13:00	0.75	<0.2	5.97	33.9	<0.015	0.10	0.43
15356000	8/13/03 13:00	0.93	<0.2	6.64	34.6	<0.015	E0.08	0.22
15356000	9/9/03 14:30	0.67	<0.2	6.04	40.5	<0.015	E0.06	0.19
15356000	9/24/03 12:30	0.62	<0.2	6.08	40.2	<0.015	0.10	E0.10

Station ID	Date/Time	Nitrogen, NO <sub>2</sub> + NO <sub>3</sub> , dissolved (mg/L)	Nitrogen, Nitrate dissolved (mg/L)	Nitrogen, particulate wat flt susp. (mg/L)	Phosphorus (mg/L)	Ortho- phosphorus (mg/L)	Phosphorus, Total (mg/L)	Carbon Inorg. + Organic Partic. Total (mg/L)
15356000	4/1/03 10:50	0.089	<0.002	<0.02	<0.004	<0.007	0.005	<0.1
15356000	5/23/03 17:40	0.026	0.003	0.08	0.006	<0.007	0.119	1.5
15356000	6/17/03 12:20	0.038	<0.002	0.26	E0.004	<0.007	0.35	5.9
15356000	7/17/03 13:00	E0.018	<0.002	0.32	<0.004	<0.007	1.10	21.4
15356000	8/13/03 13:00	E0.021	<0.002	0.15	<0.004	<0.007	0.41	8.2
15356000	9/9/03 14:30	0.033	<0.002	0.08	<0.004	<0.007	0.161	2.1
15356000	9/24/03 12:30	0.035	<0.002	0.03	<0.004	<0.007	0.061	0.5

**Table 2.** USGS National Water Quality Laboratory analyses- Yukon River at Eagle, Alaska-continued

Station ID	Date/Time	Carbon Inorganic, Partic. Total (mg/L)	Carbon, Organic dissolved (mg/L)	Carbon, Organic Particulate Total (mg/L)	Aluminum (µg/L)	Antimony (µg/L)	Arsenic (µg/L)	Barium (µg/L)
15356000	4/1/03 10:50	<0.1	1.4	<0.1	2	<0.30	0.4	61
15356000	5/23/03 17:40	<0.1	8.5	1.4	38	<0.30	0.5	46
15356000	6/17/03 12:20	1.7	3.0	4.1	29	E0.18	0.6	44
15356000	7/17/03 13:00	15.8	2.8	5.6	23	E0.23	0.6	39
15356000	8/13/03 13:00	7.6	2.2	0.7	18	E0.20	0.6	40
15356000	9/9/03 14:30	0.6	2.8	1.5	<2	<0.30	0.5	46
15356000	9/24/03 12:30	<0.1	2.1	0.5	14	<0.30	0.5	43

Station ID	Date/Time	Beryllium (µg/L)	Boron (µg/L)	Cadmium (µg/L)	Chromium (µg/L)	Cobalt (µg/L)	Copper (µg/L)	Iron (µg/L)	Lead (µg/L)	Lithium (µg/L)	Manganese (µg/L)
15356000	4/1/03 10:50	<0.06	9	<0.04	<0.8	0.074	0.8	E7	<0.08	2.3	1.8
15356000	5/23/03 17:40	<0.06	11	<0.04	<0.8	0.121	2.7	78	E0.05	2.7	8.7
15356000	6/17/03 12:20	<0.06	10	E0.03	<0.8	0.084	2.1	20	<0.08	2.6	2.5
15356000	7/17/03 13:00	<0.06	11	<0.04	<0.8	0.079	1.5	E6	<0.08	3.1	0.6
15356000	8/13/03 13:00	<0.06	13	<0.04	<0.8	0.084	1.2	<8	<0.08	2.8	2.1
15356000	9/9/03 14:30	<0.06	7	<0.04	<0.8	0.082	1.2	10	<0.08	<0.5	2.0
15356000	9/24/03 12:30	<0.06	10	E0.02	<0.8	0.094	1.0	9	<0.08	2.8	4.1

Station ID	Date/Time	Molybdenum (µg/L)	Nickel (µg/L)	Selenium (µg/L)	Silver (µg/L)	Strontium (µg/L)	Vanadium (µg/L)	Zinc (µg/L)	Uranium, natural (µg/L)	Sediment, Susp. (Sieve diam. % < 0.062mm)	Sediment, Susp. (mg/L)
15356000	4/1/03 10:50	1.4	1.78	0.6	<0.2	171	0.2	3	1.31	--	1
15356000	5/23/03 17:40	1.0	3.26	E.4	<0.2	140	1.0	3	0.97	52	129
15356000	6/17/03 12:20	1.0	1.55	0.6	<0.2	129	0.9	1	0.76	66	312
15356000	7/17/03 13:00	1.4	1.32	0.5	<0.2	148	0.6	<1	0.93	84	933
15356000	8/13/03 13:00	1.6	1.77	0.5	<0.2	157	0.9	<1	0.90	78	400
15356000	9/9/03 14:30	1.1	1.45	E0.4	<0.2	167	0.4	M	0.98	55	157
15356000	9/24/03 12:30	1.2	1.77	0.5	<0.2	164	0.6	M	0.94	42	64

**Table 3.** USGS National Water Quality Laboratory analyses- Porcupine River near Fort Yukon, Alaska

[Station ID, refer to table 1 for description and figure 1 for location; ft<sup>3</sup>/s, cubic feet per second; mg/L, milligram per liter; NTU, Nephelometric turbidity unit; <; less than detection limit; --, missing value; mm, millimeter; lab, laboratory; fld, field; µS/cm, microsiemen per centimeter at 25 degrees Celsius; cm, centimeter; C, Celsius; UV, Ultraviolet; nm, nanometer; Flt, filtered; NO<sub>2</sub>, nitrite; NO<sub>3</sub>, nitrate; wat flt susp., water filtered suspended; µg/L, microgram per liter; Dis fet lab, dissolved fixed end-point titration in laboratory; Dis tot IT, dissolved total incremental titration; Dis IT field, dissolved incremental titration in the field; %, percent; E, estimated; M, presence of material verified but not quantified; major ion, phosphorous, orthophosphorous, and trace element analyses are dissolved]

Station ID	Date/Time	Discharge (ft <sup>3</sup> /s)	Solids, Residue at 180° C, Dissolved (mg/L)	Turbidity Lab Hach (NTU)	Barometric Pressure (mm of Hg)	Oxygen, dissolved (mg/L)	pH, Field (Standard Units)	pH, Lab (Standard Units)
15389000	4/4/03 15:30	1,190	233	1.1	758	5.0	7.4	7.8
15389000	6/9/03 15:10	48,500	96	40	761	9.8	7.8	7.8
15389000	6/19/03 14:20	17,400	115	9.6	753	--	8.0	7.6
15389000	7/1/03 14:30	16,200	151	3.0	740	7.9	8.2	7.7
15389000	7/23/03 15:40	27,000	128	34	756	9.6	7.8	8.0
15389000	8/19/03 13:10	35,900	124	40	743	9.8	8.0	7.5
15389000	9/22/03 13:00	13,400	157	6.7	764	12.8	8.3	8.1

Station ID	Date/Time	Specific Conductance, Lab (µS /cm)	Specific Conductance Fld (µS /cm)	Air Temp (°C)	Water Temp (°C)	UV Absorbance 254 nm, Flt (units/cm)	UV Absorbance 280 nm, Flt (units/cm)	Calcium (mg/L)	Magnesium (mg/L)
15389000	4/4/03 15:30	392	385	-20.0	0.0	0.042	0.030	60.5	12.7
15389000	6/9/03 15:10	122	120	--	12.2	0.357	0.268	18.2	3.52
15389000	6/19/03 14:20	184	187	--	--	0.268	0.196	28.2	5.37
15389000	7/1/03 14:30	216	217	--	19.6	--	--	31.8	6.35
15389000	7/23/03 15:40	184	184	--	16.1	0.403	0.298	25.2	6.03
15389000	8/19/03 13:10	181	182	--	11.6	0.305	0.226	26.6	6.62
15389000	9/22/03 13:00	229	230	--	1.4	0.278	0.201	34.5	6.92



**Table 3.** USGS National Water Quality Laboratory analyses- Porcupine River near Fort Yukon, Alaska-continued

Station ID	Date/Time	Chloride (mg/L)	Fluoride (mg/L)	Silica (mg/L)	Sulfate (mg/L)	Nitrogen, Ammonia dissolved (mg/L)	Nitrogen, Ammonia + Organic Dissolved (mg/L)	Nitrogen, Ammonia + Organic Total (mg/L)
15389000	4/4/03 15:30	4.03	0.08	4.46	31.9	<0.015	E0.07	E0.08
15389000	6/9/03 15:10	0.66	<0.2	2.41	13.2	<0.015	0.29	0.61
15389000	6/19/03 14:20	1.13	<0.2	3.05	20.0	<0.015	0.24	0.33
15389000	7/1/03 14:30	1.86	<0.2	2.70	27.4	<0.015	0.28	0.30
15389000	7/23/03 15:40	1.16	<0.2	3.45	29.1	<0.015	0.28	0.38
15389000	8/19/03 13:10	0.71	<0.2	3.77	32.2	<0.015	0.23	0.37
15389000	9/22/03 13:00	1.34	<0.2	3.81	32.3	<0.015	0.28	0.29

Station ID	Date/Time	Potassium (mg/L)	Sodium (mg/L)	Alkalinity, Dis fet lab, as CaCO3 (mg/L)	Alkalinity, Dis tot IT Field (mg/L)	Bicarbonate, Dis IT Field (mg/L)	Carbonate, Dis IT Field (mg/L)
15389000	4/4/03 15:30	0.53	5.07	176	175	213	0
15389000	6/9/03 15:10	0.58	1.24	47	46	56	0
15389000	6/19/03 14:20	0.57	1.94	72	72	88	0
15389000	7/1/03 14:30	0.63	3.07	81	81	98	0
15389000	7/23/03 15:40	0.46	2.25	59	59	71	0
15389000	8/19/03 13:10	0.39	1.93	55	53	65	0
15389000	9/22/03 13:00	0.36	2.35	86	86	105	0

Station ID	Date/Time	Nitrogen, NO <sub>3</sub> , dissolved (mg/L)	Nitrate dissolved (mg/L)	Nitrogen, particulate wat ftt susp (mg/L)	Phosphorus (mg/L)	Ortho- phosphorus (mg/L)	Phosphorus, Total (mg/L)	Carbon Inorg. + Organic Partic. Total (mg/L)
15389000	4/4/03 15:30	0.208	<0.002	<0.02	<0.004	<0.007	0.004	<0.1
15389000	6/9/03 15:10	0.028	E0.002	0.20	0.011	<0.007	0.109	2.4
15389000	6/19/03 14:20	<0.022	E0.002	0.05	E0.004	<0.007	0.023	0.7
15389000	7/1/03 14:30	<0.022	<0.002	0.06	E0.003	<0.007	0.013	0.6
15389000	7/23/03 15:40	0.029	E0.002	0.14	0.007	<0.007	0.052	1.5
15389000	8/19/03 13:10	0.035	<0.002	0.18	0.005	<0.007	0.074	2.0
15389000	9/22/03 13:00	0.026	<0.002	0.03	0.005	<0.007	0.015	0.5

**Table 3.** USGS National Water Quality Laboratory analyses- Porcupine River near Fort Yukon, Alaska-continued

Station ID	Date/Time	Carbon Inorganic, Partic. Total (mg/L)	Carbon, Organic dissolved (mg/L)	Carbon, Organic Particulate Total (mg/L)	Aluminum (µg/L)	Antimony (µg/L)	Arsenic (µg/L)	Barium (µg/L)
15389000	4/4/03 15:30	<0.1	1.7	<0.1	2	<0.30	E0.2	86
15389000	6/9/03 15:10	<0.1	9.4	2.4	27	<0.30	0.3	37
15389000	6/19/03 14:20	<0.1	7.8	0.7	22	<0.30	0.4	46
15389000	7/1/03 14:30	<0.1	8.6	0.6	20	<0.30	0.4	56
15389000	7/23/03 15:40	<0.1	12.0	1.4	36	<0.30	0.3	45
15389000	8/19/03 13:10	<0.1	8.7	2.0	30	<0.30	E0.2	40
15389000	9/22/03 13:00	<0.1	9.1	0.5	28	<0.30	0.3	47

Station ID	Date/Time	Beryllium (µg/L)	Boron (µg/L)	Cadmium (µg/L)	Chromium (µg/L)	Cobalt (µg/L)	Copper (µg/L)	Iron (µg/L)	Lead (µg/L)	Lithium (µg/L)	Manganese (µg/L)
15389000	4/4/03 15:30	<0.06	9	<0.04	<0.8	0.196	0.6	11	<0.08	7.2	13.7
15389000	6/9/03 15:10	<0.06	E5	<0.04	<0.8	0.114	2.0	172	0.12	2.2	2.5
15389000	6/19/03 14:20	<0.06	E5	<0.04	<0.8	0.098	1.8	115	E0.08	3.3	2.0
15389000	7/1/03 14:30	<0.06	8	<0.04	<0.8	0.095	1.7	59	<0.08	4.6	1.5
15389000	7/23/03 15:40	<0.06	8	E0.02	<0.8	0.121	2.3	137	E0.08	4.1	2.6
15389000	8/19/03 13:10	<0.06	E6	<0.04	<0.8	0.149	2.3	116	E0.08	3.9	3.4
15389000	9/22/03 13:00	<0.06	E6	<0.04	<0.8	0.184	1.4	121	<0.08	4.5	6.0

Station ID	Date/Time	Molybdenum (µg/L)	Nickel (µg/L)	Selenium (µg/L)	Silver (µg/L)	Strontium (µg/L)	Vanadium (µg/L)	Zinc (µg/L)	Uranium, natural (µg/L)	Sediment, Susp. (Sieve diam. % <0.062mm)	Sediment, Susp. (mg/L)
15389000	4/4/03 15:30	0.7	1.22	E.5	<0.2	154	0.4	2	0.88	--	1
15389000	6/9/03 15:10	E0.3	2.33	<0.5	<0.2	54.1	0.8	2	0.23	95	98
15389000	6/19/03 14:20	0.4	2.55	E.4	<0.2	79.5	1.0	M	0.40	90	13
15389000	7/1/03 14:30	0.5	2.64	<0.5	<0.2	104	0.6	4	0.39	92	6
15389000	7/23/03 15:40	0.4	3.20	<0.5	<0.2	81.3	0.3	1	0.25	98	48
15389000	8/19/03 13:10	E0.3	3.81	<0.5	<0.2	98.9	0.2	2	0.24	94	61
15389000	9/22/03 13:00	E0.3	3.19	<0.5	<0.2	109	0.3	2	0.42	93	10

**Table 4.** USGS National Water Quality Laboratory analyses- Yukon River near Stevens Village, Alaska

[Station ID, refer to table 1 for description and figure 1 for location; ft<sup>3</sup>/s, cubic feet per second; mg/L, milligram per liter; NTU, Nephelometric turbidity unit; <; less than detection limit; --, missing value; mm, millimeter; lab, laboratory; fld, field; µS/cm, microsiemen per centimeter at 25 degrees Celsius; cm, centimeter; C, Celsius; UV, Ultraviolet; nm, nanometer; Flt, filtered; NO<sub>3</sub><sup>-</sup>, nitrate; NO<sub>2</sub><sup>-</sup>, nitrite; wat flt susp., water filtered suspended; µg/L, microgram per liter; Dis fet lab, dissolved fixed end-point titration in laboratory; Dis tot IT, dissolved total incremental titration; Dis IT field, dissolved incremental titration in the field; %, percent; E, estimated; M, presence of material verified but not quantified; major ion, phosphorous, orthophosphorous, and trace element analyses are dissolved]

Station ID	Date/Time	Discharge (ft <sup>3</sup> /s)	Solids, Residue at 180° C, Dissolved (mg/L)	Turbidity Lab Hach (NTU)	Barometric Pressure (mm of Hg)	Oxygen, dissolved (mg/L)	pH, Field (Standard Units)	pH, Lab (Standard Units)
15453500	3/26/03 19:00	26,500	187	8.0	770	8.4	7.5	7.6
15453500	5/29/03 16:00	192,000	134	48	761	10.3	7.6	7.4
15453500	6/12/03 14:20	310,000	113	110	761	9.3	7.8	7.4
15453500	7/15/03 16:00	204,000	144	220	752	9.3	8.0	7.8
15453500	7/24/03 14:10	227,000	143	390	761	8.9	8.0	8.1
15453500	8/21/03 13:30	195,000	143	210	752	9.1	8.2	E7.7
15453500	9/11/03 16:10	218,000	149	35	760	9.9	8.1	7.9

Station ID	Date/Time	Specific Conductance, Lab (µS/cm)	Specific Conductance Fld (µS/cm)	Air Temp (°C)	Water Temp (°C)	UV Absorbance 254 nm, Flt (units/cm)	UV Absorbance 280 nm, Flt (units/cm)	Calcium (mg/L)	Magnesium (mg/L)
15453500	3/26/03 19:00	296	286	-8.0	0.0	0.039	0.028	41.6	10.4
15453500	5/29/03 16:00	175	156	--	9.5	0.500	0.376	25.7	6.12
15453500	6/12/03 14:20	186	179	--	14.7	0.229	0.172	26.5	6.66
15453500	7/15/03 16:00	215	221	--	16.8	0.149	0.110	31.1	8.32
15453500	7/24/03 14:10	216	230	--	18.0	0.155	0.114	30.6	8.07
15453500	8/21/03 13:30	216	226	--	14.3	0.131	0.095	32.2	7.73
15453500	9/11/03 16:10	219	217	9.0	8.8	0.251	0.185	28.4	7.92

**Table 4.** USGS National Water Quality Laboratory analyses- Yukon River near Stevens Village, Alaska-continued

Station ID	Date/Time	Potassium (mg/L)	Sodium (mg/L)	Alkalinity Wat. Dis fet lab CaCO3 (mg/L)	Alkalinity, Dis tot IT Field (mg/L)	Bicarbonate, Dis IT Field (mg/L)	Carbonate, Dis IT Field (mg/L)
15453500	3/26/03 19:00	0.91	3.19	121	119	145	0
15453500	5/29/03 16:00	0.93	1.98	64	63	77	0
15453500	6/12/03 14:20	0.82	2.59	67	66	80	0
15453500	7/15/03 16:00	1.29	2.87	82	78	95	0
15453500	7/24/03 14:10	1.31	2.88	77	81	98	0
15453500	8/21/03 13:30	1.12	2.64	80	83	101	0
15453500	9/11/03 16:10	0.73	2.13	93	69	84	0

Station ID	Date/Time	Chloride (mg/L)	Fluoride (mg/L)	Silica (mg/L)	Sulfate (mg/L)	Nitrogen, Ammonia dissolved (mg/L)	Nitrogen, Ammonia + Organic Dissolved (mg/L)	Nitrogen, Ammonia + Organic Total (mg/L)
15453500	3/26/03 19:00	0.65	0.13	7.06	34.2	<0.015	E0.08	E0.10
15453500	5/29/03 16:00	0.96	<0.2	4.34	21.7	<0.015	0.36	0.50
15453500	6/12/03 14:20	0.54	<0.2	4.33	23.9	<0.015	0.17	0.65
15453500	7/15/03 16:00	1.20	<0.2	6.36	31.8	<0.015	0.14	0.33
15453500	7/24/03 14:10	1.41	<0.2	5.80	34.0	<0.015	0.18	0.41
15453500	8/21/03 13:30	0.79	<0.2	5.65	34.6	<0.015	0.11	0.29
15453500	9/11/03 16:10	0.81	<0.2	5.48	31.6	<0.015	0.18	0.29

**Table 4.** USGS National Water Quality Laboratory analyses- Yukon River near Stevens Village, Alaska-continued

Station ID	Date/Time	Nitrogen, NO <sub>3</sub> , dissolved (mg/L)	Nitrogen, NO <sub>2</sub> , + NO <sub>3</sub> , dissolved (mg/L)	Nitrogen, Nitrate dissolved (mg/L)	Nitrogen, particulate wat flt susp (mg/L)	Phosphorus (mg/L)	Ortho-phosphorus (mg/L)	Phosphorus, Total (mg/L)	Carbon Inorg. + Organic Partic. Total (mg/L)
15453500	3/26/03 19:00	0.109	<0.002	<0.002	<0.02	E0.003	<0.007	0.006	0.5
15453500	5/29/03 16:00	0.025	0.003	0.003	0.16	0.008	<0.007	0.175	2.9
15453500	6/12/03 14:20	0.040	<0.002	<0.002	0.19	0.006	<0.007	0.44	3.0
15453500	7/15/03 16:00	0.028	<0.002	<0.002	0.20	E0.004	<0.007	0.36	7.0
15453500	7/24/03 14:10	0.041	<0.002	<0.002	0.23	E0.004	<0.007	0.49	10.5
15453500	8/21/03 13:30	0.035	<0.002	<0.002	0.18	<0.004	<0.007	0.29	6.5
15453500	9/11/03 16:10	0.080	<0.002	<0.002	0.09	<0.004	<0.007	0.106	1.9

Station ID	Date/Time	Carbon Inorganic, Partic. Total (mg/L)	Carbon, Organic dissolved (mg/L)	Carbon, Organic Particulate Total (mg/L)	Aluminum (µg/L)	Antimony (µg/L)	Arsenic (µg/L)	Barium (µg/L)
15453500	3/26/03 19:00	<0.1	1.8	0.5	2	<0.30	0.4	74
15453500	5/29/03 16:00	0.2	12.9	2.7	36	<0.30	0.5	42
15453500	6/12/03 14:20	0.3	5.9	2.7	25	<0.30	0.5	40
15453500	7/15/03 16:00	3.4	4.8	3.6	24	E0.17	0.6	43
15453500	7/24/03 14:10	6.2	5.0	4.3	27	E0.20	0.6	44
15453500	8/21/03 13:30	4.0	4.0	2.4	22	E0.17	0.5	41
15453500	9/11/03 16:10	0.3	7.3	1.7	24	<0.30	0.5	44

Station ID	Date/Time	Beryllium (µg/L)	Boron (µg/L)	Cadmium (µg/L)	Chromium (µg/L)	Cobalt (µg/L)	Copper (µg/L)	Iron (µg/L)	Lead (µg/L)	Lithium (µg/L)	Manganese (µg/L)
15453500	3/26/03 19:00	<0.06	12	<.04	<0.8	0.093	1.0	E7	<0.08	3.3	8.5
15453500	5/29/03 16:00	<0.06	8	E0.02	<0.8	0.138	3.4	175	0.09	2.7	7.2
15453500	6/12/03 14:20	<0.06	E7	<0.04	<0.8	0.105	2.5	72	E0.06	2.6	4.7
15453500	7/15/03 16:00	<0.06	9	<0.04	<0.8	0.079	2.2	10	<0.08	3.1	1.1
15453500	7/24/03 14:10	<0.06	10	<0.04	<0.8	0.082	2.2	19	<0.08	3.6	1.0
15453500	8/21/03 13:30	<0.06	8	<0.04	<0.8	0.098	2.0	20	<0.08	3.6	1.4
15453500	9/11/03 16:10	<0.06	15	<0.04	<0.8	0.105	1.9	68	<0.08	3.6	3.4

**Table 4.** USGS National Water Quality Laboratory analyses- Yukon River near Stevens Village, Alaska-continued

Station ID	Date/Time	Molybdenum (µg/L)	Nickel (µg/L)	Selenium (µg/L)	Silver (µg/L)	Strontium (µg/L)	Vanadium (µg/L)	Zinc (µg/L)	Uranium, natural (µg/L)	Sediment, Susp. (Sieve diam. % <0.062mm)	Sediment, Susp. (mg/L)
15453500	3/26/03 19:00	1.2	1.28	0.6	<0.2	173	0.7	2	1.2	--	6
15453500	5/29/03 16:00	0.6	2.72	E.4	<0.2	93.6	0.7	2	0.63	53	9
15453500	6/12/03 14:20	0.7	1.62	E.3	<0.2	99.9	0.8	M	0.61	74	356
15453500	7/15/03 16:00	1.0	1.98	E.3	<0.2	137	0.9	<1	0.82	83	299
15453500	7/24/03 14:10	1.1	2.00	0.5	<0.2	137	0.6	M	0.69	90	468
15453500	8/21/03 13:30	0.9	2.17	E0.3	<0.2	136	0.5	M	0.67	80	267
15453500	9/11/03 16:10	0.8	1.93	E0.3	<0.2	119	0.4	<1	0.67	57	114

**Table 5.** USGS National Water Quality Laboratory analyses- Tanana River at Nenana, Alaska

[Station ID, refer to table 1 for description and figure 1 for location; ft<sup>3</sup>/s, cubic feet per second; mg/L, milligram per liter; NTU, Nephelometric turbidity unit; <, less than detection limit; --, missing value; mm, millimeter; lab, laboratory; fld, field; µS/cm, microsiemen per centimeter at 25 degrees Celsius; cm, centimeter; C, Celsius; UV, Ultraviolet; nm, nanometer; FIt, filtered; NO<sub>2</sub>, nitrite; NO<sub>3</sub>, nitrate; wat fIt susp., water filtered suspended; µg/L, microgram per liter; Dis fet lab, dissolved fixed end-point titration in laboratory; Dis tot IT, dissolved total incremental titration; Dis IT field, dissolved incremental titration in the field; %, percent; E, estimated; M, presence of material verified but not quantified; major ion, phosphorous, orthophosphorous, and trace element analyses are dissolved]

Station ID	Date/Time	Discharge (ft <sup>3</sup> /s)	Solids, Residue at 180°C, Dissolved (mg/L)	Turbidity Lab Hach (NTU)	Barometric Pressure (mm of Hg)	Oxygen, dissolved (mg/L)	pH, Field (Standard Units)	pH, Lab (Standard Units)
15515500	3/19/03 18:30	7,740	200	9.4	750	7.8	7.3	E7.4
15515500	5/8/03 14:40	26,200	154	180	765	12.0	8.0	7.5
15515500	5/28/03 15:30	19,600	164	32	--	9.4	7.8	E7.3
15515500	6/11/03 13:30	31,500	163	130	757	9.0	7.8	7.8
15515500	7/22/03 13:30	76,200	138	E930	775	9.5	7.9	7.6
15515500	8/15/03 11:30	66,100	143	2,000	731	9.3	7.9	8.0
15515500	9/12/03 13:40	38,800	155	97	768	10.8	7.9	7.6

Station ID	Date/Time	Specific Conductance, Lab (µS/cm)	Specific Conductance Fld (µS/cm)	Air Temp. (°C)	Water Temp. (°C)	UV Absorbance 254 nm, FIt (units/cm)	UV Absorbance 280 nm, FIt (units/cm)	Calcium (mg/L)	Magnesium (mg/L)
15515500	3/19/03 18:30	312	320	-4.0	0.0	0.032	0.023	42.3	8.80
15515500	5/8/03 14:40	250	248	--	5.7	0.107	0.079	34.2	7.64
15515500	5/28/03 15:30	271	256	--	12.4	0.108	0.080	35.7	8.24
15515500	6/11/03 13:30	258	272	--	16.8	0.096	0.071	35.5	8.80
15515500	7/22/03 13:30	219	221	--	16.7	0.056	0.043	31.6	6.79
15515500	8/15/03 11:30	227	236	--	13.4	0.025	0.018	34.1	7.19
15515500	9/12/03 13:40	242	242	--	7.3	0.104	0.076	33.7	8.57

**Table 5.** USGS National Water Quality Laboratory analyses- Tanana River at Nenana, Alaska-continued

Station ID	Date/Time	Potassium (mg/L)	Sodium (mg/L)	Alkalinity, Dis fet lab, as CaCO3 (mg/L)	Alkalinity, Dis tot IT Field (mg/L)	Bicarbonate, Dis IT Field (mg/L)	Carbonate, Dis IT Field (mg/L)
15515500	3/19/03 18:30	2.01	3.95	133	128	156	0
15515500	5/8/03 14:40	1.79	3.58	91	90	109	0
15515500	5/28/03 15:30	1.84	4.22	102	98	120	0
15515500	6/11/03 13:30	1.99	4.36	102	88	107	0
15515500	7/22/03 13:30	2.02	3.46	71	72	88	0
15515500	8/15/03 11:30	2.98	3.60	74	74	90	0
15515500	9/12/03 13:40	1.67	3.64	85	81	99	0

Station ID	Date/Time	Chloride (mg/L)	Fluoride (mg/L)	Silica (mg/L)	Sulfate (mg/L)	Nitrogen, Ammonia dissolved (mg/L)	Nitrogen, Ammonia + Organic Dissolved (mg/L)	Nitrogen, Ammonia + Organic Total (mg/L)
15515500	3/19/03 18:30	0.74	0.13	14.5	34.2	0.047	E0.08	E0.09
15515500	5/8/03 14:40	1.77	<0.17	10.2	32.8	0.027	0.14	0.43
15515500	5/28/03 15:30	2.20	<0.2	10.0	35.4	<0.015	0.11	0.23
15515500	6/11/03 13:30	2.63	<0.2	9.13	40.6	<0.015	E0.07	0.36
15515500	7/22/03 13:30	1.86	<0.2	7.01	37.3	<0.015	<0.10	0.87
15515500	8/15/03 11:30	1.43	<0.2	5.88	40.4	<0.015	<0.10	1.1
15515500	9/12/03 13:40	1.50	<0.2	9.80	35.4	E0.009	0.11	0.26



**Table 5.** USGS National Water Quality Laboratory analyses- Tanana River at Nenana, Alaska-continued

Station ID	Date/Time	Nitrogen, NO <sub>3</sub> - NO <sub>3</sub> -dissolved (mg/L)	Nitrogen, NO <sub>3</sub> - Nitrate dissolved (mg/L)	Nitrogen, particulate w/fit susp (mg/L)	Phosphorus (mg/L)	Ortho- phosphorus (mg/L)	Phosphorus, Total (mg/L)	Carbon Inorg. + Organic Partic. Total (mg/L)
15515500	3/19/03 18:30	0.186	<0.002	<0.02	<0.004	<0.007	0.032	0.3
15515500	5/8/03 14:40	0.135	0.003	0.25	0.007	<0.007	0.62	4.5
15515500	5/28/03 15:30	0.054	0.003	0.08	0.005	<0.007	0.25	1.0
15515500	6/11/03 13:30	0.089	E0.002	0.15	E0.004	<0.007	0.42	2.1
15515500	7/22/03 13:30	0.091	E0.002	0.44	E0.004	<0.007	1.55	9.4
15515500	8/15/03 11:30	0.087	<0.002	E0.64	<0.004	<0.007	1.72	E15.0
15515500	9/12/03 13:40	0.145	<0.002	0.14	0.007	<0.007	0.50	2.5

Station ID	Date/Time	Carbon Inorganic, Partic. Total (mg/L)	Carbon, Organic dissolved (mg/L)	Carbon, Organic Particulate Total (mg/L)	Aluminum (µg/L)	Antimony (µg/L)	Arsenic (µg/L)	Barium (µg/L)
15515500	3/19/03 18:30	<0.1	1.6	0.3	E1	<0.30	0.4	46
15515500	5/8/03 14:40	0.5	3.5	4.0	8	E0.23	1.0	42
15515500	5/28/03 15:30	<0.1	3.0	1.0	10	E0.22	1.2	38
15515500	6/11/03 13:30	0.2	2.8	1.8	17	E0.25	1.1	39
15515500	7/22/03 13:30	2.6	1.7	6.9	21	0.42	1.1	32
15515500	8/15/03 11:30	E12.0	1.0	E3.0	18	0.56	0.9	37
15515500	9/12/03 13:40	0.4	3.2	2.1	14	E0.17	0.9	30

**Table 5.** USGS National Water Quality Laboratory analyses- Tanana River at Nenana, Alaska-continued

Station ID	Date/Time	Beryllium (µg/L)	Boron (µg/L)	Cadmium (µg/L)	Chromium (µg/L)	Cobalt (µg/L)	Copper (µg/L)	Iron (µg/L)	Lead (µg/L)	Lithium (µg/L)	Manganese (µg/L)
15515500	3/19/03 18:30	<0.06	23	<0.04	<0.8	0.228	1.0	27	<0.08	2.7	83.2
15515500	5/8/03 14:40	<0.06	19	<0.04	<0.8	0.201	2.2	57	E0.04	2.6	41.0
15515500	5/28/03 15:30	<0.06	32	<0.04	<0.8	0.153	2.2	109	E0.04	3.9	20.0
15515500	6/11/03 13:30	<0.06	30	0.04	<0.8	0.164	2.3	28	E0.04	4.8	13.7
15515500	7/22/03 13:30	<0.06	17	<0.04	<0.8	0.102	1.4	E5	<0.08	3.6	5.4
15515500	8/15/03 11:30	<0.06	20	<0.04	<0.8	0.089	0.8	E6	<0.08	4.6	1.3
15515500	9/12/03 13:40	<0.06	17	E0.02	<0.8	0.168	1.7	63	E0.06	3.4	21.7

Station ID	Date/Time	Molybdenum (µg/L)	Nickel (µg/L)	Selenium (µg/L)	Silver (µg/L)	Strontium (µg/L)	Vanadium (µg/L)	Zinc (µg/L)	Uranium, natural (µg/L)	Sediment, Susp. (Sieve diam. % <0.062mm)	Sediment, Susp. (mg/L)
15515500	3/19/03 18:30	1.1	1.55	0.5	<0.2	190	0.4	5	0.78	54	30
15515500	5/8/03 14:40	1.1	2.17	0.6	<0.2	156	1.3	3	0.85	51	976
15515500	5/28/03 15:30	1.3	2.12	0.6	<0.2	176	2.0	2	0.92	30	342
15515500	6/11/03 13:30	1.1	1.53	E0.5	<0.2	146	0.8	3	0.95	55	543
15515500	7/22/03 13:30	1.1	1.65	0.6	<0.2	136	0.6	<1	0.88	62	2940
15515500	8/15/03 11:30	1.3	1.94	0.8	<0.2	141	0.9	M	1.08	79	3960
15515500	9/12/03 13:40	1.0	1.15	E0.5	<0.2	140	0.6	<1	0.73	30	806

**Table 6.** USGS National Water Quality Laboratory analyses- Yukon River at Pilot Station, Alaska

[Station ID, refer to table 1 for description and figure 1 for location; ft<sup>3</sup>/s, cubic feet per second; mg/L, milligram per liter; NTU, Nephelometric turbidity unit; <, less than detection limit; --, missing value; mm, millimeter; lab, laboratory; fld, field; µS/cm, microsiemen per centimeter at 25 degrees Celsius; cm, centimeter; C, Celsius; UV, Ultraviolet; nm, nanometer; Flt, filtered; NO<sub>2</sub>, nitrite; NO<sub>3</sub>, nitrate; wat flt susp., water filtered suspended; µg/L, microgram per liter; Dis fet lab, dissolved fixed end-point titration in laboratory; Dis tot IT, dissolved total incremental titration; Dis IT field, dissolved incremental titration in the field; %, percent; E, estimated; major ion, phosphorous, orthophosphorous, and trace element analyses are dissolved]

Station ID	Date/Time	Discharge (ft <sup>3</sup> /s)	Solids, Residue at 180° C, Dissolved (mg/L)	Turbidity Lab Hach (NTU)	Barometric Pressure (mm of Hg)	Oxygen, dissolved (mg/L)	pH, Field (Standard Units)	pH, Lab (Standard Units)
15565447	3/25/03 19:00	54,300	201	13	766	3.6	7.0	7.5
15565447	5/28/03 14:40	447,000	112	72	762	10.0	7.5	7.9
15565447	6/17/03 17:20	539,000	112	150	755	8.0	7.8	8.0
15565447	7/10/03 18:20	350,000	130	150	764	8.6	7.7	8.0
15565447	7/24/03 19:50	404,000	140	E270	757	8.9	8.1	7.7
15565447	8/19/03 17:10	364,000	114	200	755	9.1	7.7	8.0
15565447	9/23/03 18:00	429,000	155	49	751	11.0	7.9	E7.4

Station ID	Date/Time	Specific Conductance, Lab (µS/cm)	Specific Conductance Fld (µS/cm)	Air Temp (°C)	Water Temp (°C)	UV Absorbance 254 nm, Flt (units/cm)	UV Absorbance 280 nm, Flt (units/cm)	Calcium (mg/L)	Magnesium (mg/L)
15565447	3/25/03 19:00	315	323	-8.4	0.0	0.069	0.051	44.0	10.5
15565447	5/28/03 14:40	161	156	11.0	7.5	0.458	0.345	23.7	5.12
15565447	6/17/03 17:20	166	165	18.0	15.0	0.372	0.279	24.2	5.09
15565447	7/10/03 18:20	207	206	14.0	17.5	0.183	0.136	29.0	7.15
15565447	7/24/03 19:50	212	222	15.0	16.5	0.149	0.109	30.1	7.65
15565447	8/19/03 17:10	212	217	15.5	14.5	0.183	0.135	28.9	7.55
15565447	9/23/03 18:00	204	213	5.0	6.5	0.284	0.210	29.6	7.88

**Table 6.** USGS National Water Quality Laboratory analyses- Yukon River at Pilot Station, Alaska-continued

Station ID	Date/Time	Chloride (mg/L)	Fluoride (mg/L)	Silica (mg/L)	Sulfate (mg/L)	Nitrogen, Ammonia dissolved (mg/L)	Nitrogen, Ammonia Organic Dissolved (mg/L)	Nitrogen, Ammonia + Organic Total (mg/L)
15565447	3/25/03 19:00	0.90	0.12	11.4	28.4	--	0.19	0.19
15565447	5/28/03 14:40	1.05	<0.2	4.87	16.7	<0.015	0.36	0.67
15565447	6/17/03 17:20	0.60	<0.2	4.74	16.5	<0.015	0.28	0.81
15565447	7/10/03 18:20	1.31	<0.2	6.29	27.2	<0.015	0.14	0.55
15565447	7/24/03 19:50	0.99	<0.2	6.04	31.2	--	--	--
15565447	8/19/03 17:10	1.09	<0.2	6.79	29.6	<0.015	0.17	0.40
15565447	9/23/03 18:00	0.83	<0.2	7.11	29.5	<0.015	0.24	0.42

Station ID	Date/Time	Potassium (mg/L)	Sodium (mg/L)	Alkalinity, Dis fet lab, as CaCO3 (mg/L)	Alkalinity, Dis tot IT Field (mg/L)	Bicarbonate, Dis IT Field (mg/L)	Carbonate, Dis IT Field (mg/L)
15565447	3/25/03 19:00	1.20	3.50	141	131	160	0
15565447	5/28/03 14:40	0.97	1.93	60	60	74	0
15565447	6/17/03 17:20	0.90	1.64	64	66	80	0
15565447	7/10/03 18:20	1.15	2.60	76	70	86	0
15565447	7/24/03 19:50	1.31	2.67	77	71	87	0
15565447	8/19/03 17:10	1.47	2.98	77	74	89	0
15565447	9/23/03 18:00	0.93	2.53	76	75	92	0

Station ID	Date/Time	Nitrogen, NO <sub>3</sub> <sup>-</sup> dissolved (mg/L)	Nitrite (mg/L)	Nitrogen, Nitrite dissolved (mg/L)	Nitrogen, particulate wat flt susp (mg/L)	Phosphorus (mg/L)	Ortho- phosphorus (mg/L)	Phosphorus, Total (mg/L)	Carbon Inorg. + Organic Partic. Total (mg/L)
15565447	3/25/03 19:00	--	--	--	0.04	0.006	--	0.022	0.4
15565447	5/28/03 14:40	0.083	0.005	0.005	0.20	0.013	E0.004	0.28	2.8
15565447	6/17/03 17:20	0.057	E0.002	E0.002	0.17	0.010	<0.007	0.37	3.0
15565447	7/10/03 18:20	0.082	E0.002	E0.002	0.14	0.011	<0.007	0.24	2.8
15565447	7/24/03 19:50	--	--	--	0.34	--	--	E0.34	7.9
15565447	8/19/03 17:10	0.079	<0.002	<0.002	0.18	0.007	<0.007	0.29	4.5
15565447	9/23/03 18:00	0.094	<0.002	<0.002	0.14	0.010	E0.005	0.17	2.3

**Table 6.** USGS National Water Quality Laboratory analyses- Yukon River at Pilot Station, Alaska-continued

Station ID	Date/Time	Carbon Inorganic, Partic. Total (mg/L)	Carbon, Organic dissolved (mg/L)	Carbon, Organic Particulate Total (mg/L)	Aluminum (µg/L)	Antimony (µg/L)	Arsenic (µg/L)	Barium (µg/L)
15565447	3/25/03 19:00	<0.1	2.5	0.4	3	<0.30	0.5	86
15565447	5/28/03 14:40	<0.1	11.6	2.7	21	E0.18	0.7	35
15565447	6/17/03 17:20	0.2	9.4	2.8	18	E0.17	0.8	38
15565447	7/10/03 18:20	0.3	5.6	2.5	--	--	0.9	--
15565447	7/24/03 19:50	2.0	4.6	6.0	12	E0.20	0.9	44
15565447	8/19/03 17:10	0.6	5.5	3.9	13	E0.27	0.9	41
15565447	9/23/03 18:00	<0.1	8.7	2.2	16	E0.18	0.9	37

Station ID	Date/Time	Beryllium (µg/L)	Boron (µg/L)	Cadmium (µg/L)	Chromium (µg/L)	Cobalt (µg/L)	Copper (µg/L)	Iron (µg/L)	Lead (µg/L)	Lithium (µg/L)	Manganese (µg/L)
15565447	3/25/03 19:00	<0.06	12	E0.02	<0.8	0.214	0.9	101	<0.08	3.1	96.8
15565447	5/28/03 14:40	<0.06	8	E0.02	<0.8	0.138	4.5	303	0.28	1.8	14.0
15565447	6/17/03 17:20	<0.06	<7	E0.03	<0.8	0.126	4.5	173	0.17	1.9	13.0
15565447	7/10/03 18:20	--	8	--	--	--	--	126	--	2.4	--
15565447	7/24/03 19:50	<0.06	E6	<0.04	<0.8	0.100	2.5	43	E0.07	2.5	2.0
15565447	8/19/03 17:10	<0.06	9	<0.04	<0.8	0.089	3.1	91	0.22	2.8	2.9
15565447	9/23/03 18:00	<0.06	7	<0.04	<0.8	0.105	2.8	244	0.10	2.4	6.9

Station ID	Date/Time	Molybdenum (µg/L)	Nickel (µg/L)	Selenium (µg/L)	Silver (µg/L)	Strontium (µg/L)	Vanadium (µg/L)	Zinc (µg/L)	Uranium, natural (µg/L)	Sediment, Sieve diam. % < 0.062mm	Sediment, Susp. (mg/L)
15565447	3/25/03 19:00	0.8	1.64	0.6	<0.2	195	1.8	4	0.98	96	4
15565447	5/28/03 14:40	0.6	2.54	<0.5	<0.2	84.2	0.7	2	0.50	78	276
15565447	6/17/03 17:20	0.6	1.78	E.4	<0.2	93.1	0.9	1	0.51	73	402
15565447	7/10/03 18:20	--	--	<0.5	--	128	0.7	--	--	91	233
15565447	7/24/03 19:50	1.0	1.26	E0.5	<0.2	130	0.6	1	0.75	93	374
15565447	8/19/03 17:10	1.0	1.81	E0.4	<0.2	129	0.8	2	0.68	89	275
15565447	9/23/03 18:00	0.5	1.62	E0.3	<0.2	120	1.1	<1	0.59	77	152

## **CHAPTER 3 - Dissolved Organic Carbon (DOC) Characterization**

***by George R. Aiken***

A description of sample collection and processing of samples for DOC, ultraviolet (UV) absorbance spectroscopy, specific UV absorbance (SUVA), and DOC fractionation analyses is given in Schuster (2003). These analyses were performed at the USGS National Research Program Laboratories in Boulder, Colorado. Sample analysis results for WY 2003 are given in table 7.

**Table 7.** Dissolved organic carbon concentrations and fractionation analyses from fixed-station sampling sites in the Yukon River Basin

[Station ID, refer to table 1 for description and figure 1 for location; DOC, dissolved organic carbon; mg C/L, milligrams carbon per liter; UV (abs @ 254 nm), Ultraviolet absorbance at the 254 nanometer wavelength; SUVA, Specific UV absorbance; [L/mg C\*m)], liters per milligram carbon times a one meter path length; %, percent; --, missing value; all samples filtered with 0.45 µm glass fiber filters prior to analyses]

Station ID	Date	DOC (mg /L)	UV (abs @ 254nm)	SUVA [L/(mg C*m)]	Hydrophobic Acid SUVA [L/(mg C*m)]	Hydrophobic Acid (%)
15356000	4/1/2003	1.7	0.033	2.0	3.3	43
15356000	5/23/2003	9.5	0.323	3.4	4.1	52
15356000	6/17/2003	3.7	0.103	2.8	3.6	50
15356000	7/17/2003	3.0	0.079	2.7	3.4	48
15356000	8/13/2003	2.6	0.062	2.4	3.2	40
15356000	9/9/2003	3.1	0.084	2.7	3.4	44
15356000	9/24/2003	2.4	0.055	2.3	3.1	45
15389000	4/4/2003	2.1	0.042	2.0	2.8	37
15389000	6/9/2003	10.0	0.353	3.5	3.9	56
15389000	6/19/2003	8.1	0.290	3.6	3.8	55
15389000	7/1/2003	8.1	0.240	3.0	3.6	51
15389000	7/23/2003	10.7	0.394	3.7	3.8	60
15389000	8/19/2003	9.0	0.304	3.4	3.9	54
15389000	9/22/2003	8.9	0.278	3.1	3.6	52
15453500	3/26/2003	1.9	0.038	2.0	2.7	45
15453500	5/29/2003	14.9	0.497	3.3	4.2	50
15453500	6/12/2003	6.5	0.227	3.5	4.2	47
15453500	7/15/2003	4.6	0.147	3.2	3.8	53
15453500	7/24/2003	5.0	0.156	3.1	--	--
15453500	8/21/2003	4.4	0.135	3.1	3.8	51
15453500	9/11/2003	7.4	0.249	3.4	3.9	53
15515500	3/19/2003	1.4	0.039	2.8	3.1	46
15515500	5/8/2003	3.8	0.108	2.9	4.3	39
15515500	5/28/2003	3.9	0.101	2.6	3.8	41
15515500	6/11/2003	3.5	0.089	2.5	3.6	42
15515500	7/22/2003	1.9	0.053	2.8	3.8	38
15515500	8/15/2003	1.3	0.019	1.5	2.8	40
15515500	9/12/2003	3.5	0.100	2.9	3.6	49
15565447	3/25/2003	2.7	0.060	2.2	2.9	50
15565447	5/28/2003	14.0	0.453	3.2	3.9	56
15565447	6/17/2003	10.0	0.371	3.7	4.2	52
15565447	7/10/2003	5.6	0.180	3.2	--	--
15565447	7/24/2003	4.7	0.150	3.2	3.8	52
15565447	8/19/2003	5.7	0.189	3.3	3.9	52
15565447	9/23/2003	7.6	0.269	3.5	3.9	58

**Table 7.** Dissolved organic carbon concentrations and fractionation analyses from fixed-station sampling sites in the Yukon River Basin-continued

Station ID	Date	Hydrophilic organic matterSUVA [L/(mg C*m)]	Hydrophilic organic matter (%)	Transphylic Acids SUVA [L/(mg C*m)]	Transphylic Acids (%)
15356000	4/1/2003	1.9	25	2.1	20
15356000	5/23/2003	1.6	18	3.0	17
15356000	6/17/2003	1.1	26	2.5	20
15356000	7/17/2003	1.3	24	2.5	20
15356000	8/13/2003	1.6	21	2.3	21
15356000	9/9/2003	2.1	19	2.4	20
15356000	9/24/2003	2.1	22	2.3	22
15389000	4/4/2003	--	23	3.9	17
15389000	6/9/2003	1.7	18	2.9	15
15389000	6/19/2003	2.6	21	2.8	18
15389000	7/1/2003	1.9	19	2.8	19
15389000	7/23/2003	2.2	15	2.9	19
15389000	8/19/2003	2.6	15	2.6	13
15389000	9/22/2003	2.1	14	2.7	18
15453500	3/26/2003	1.4	28	1.9	21
15453500	5/29/2003	1.5	22	2.7	15
15453500	6/12/2003	1.4	22	2.9	17
15453500	7/15/2003	1.5	20	2.7	19
15453500	7/24/2003	--	--	--	--
15453500	8/21/2003	1.7	18	2.6	26
15453500	9/11/2003	1.8	17	2.7	21
15515500	3/19/2003	1.5	35	1.9	19
15515500	5/8/2003	1.7	24	2.3	18
15515500	5/28/2003	1.5	26	--	--
15515500	6/11/2003	1.5	24	2.6	15
15515500	7/22/2003	2.0	21	2.4	20
15515500	8/15/2003	1.7	--	1.9	25
15515500	9/12/2003	1.7	19	2.3	21
15565447	3/25/2003	1.6	27	2.1	18
15565447	5/28/2003	2.0	22	3.0	14
15565447	6/17/2003	2.1	16	3.0	19
15565447	7/10/2003	2.0	19	2.7	17
15565447	7/24/2003	1.9	17	2.7	19
15565447	8/19/2003	2.8	17	--	--
15565447	9/23/2003	2.8	15	2.7	12



## **CHAPTER 4 - Dissolved Major Cations and Trace Elements**

***by Howard E. Taylor, David A. Roth, and Ronald C. Antweiler***

References for the description of sample collection and processing of samples for various water-quality constituents are given in Chapter 2 of Schuster (2003). A description of sample analysis for major cations and trace elements at the USGS National Research Program Laboratories in Boulder, Colorado, is given in Schuster (2003). Sample analysis results for WY 2003 are given below in table 8.

**Table 8.** Selected dissolved major cations and trace elements from fixed-station sampling sites in the Yukon River Basin

[See Schuster (2003) for qualification of the accuracy of these data; Station ID, refer to table 1 for description and figure 1 for location; Rep, field replicate; µg/L, microgram per liter; mg/L, milligram per liter; A, average of triplicate analysis; SD, standard deviation of triplicate analysis; <, less than; ±, plus or minus]

Station ID	Date	Rep	Arsenic µg/L		Boron µg/L		Barium µg/L		Beryllium µg/L		Bismuth µg/L		Calcium mg/L	
			A	SD	A	SD	A	SD	A	SD	A	SD	A	SD
15356000	04/01/03	1 of 1	0.36	± 0.02	8.6	± 0.2	54	± 2	< 0.004	± 0.002	< 0.001	± 0.000	37	± 0
15356000	05/23/03	1 of 1	0.52	± 0.03	6.1	± 0.7	44	± 0	0.006	± 0.002	< 0.001	± 0.000	27	± 0
15356000	06/17/03	1 of 1	0.50	± 0.03	6.9	± 0.9	44	± 1	< 0.004	± 0.001	0.003	± 0.003	27	± 1
15356000	07/17/03	1 of 1	0.62	± 0.02	12	± 1	41	± 1	< 0.004	± 0.002	< 0.001	± 0.001	30	± 1
15356000	08/13/03	1 of 1	0.59	± 0.02	14	± 0	42	± 0	< 0.004	± 0.000	< 0.001	± 0.000	32	± 1
15356000	09/09/03	1 of 1	0.52	± 0.01	9.6	± 0.4	44	± 1	< 0.004	± 0.003	0.002	± 0.001	33	± 0
15356000	09/24/03	1 of 1	0.42	± 0.03	8.3	± 0.5	45	± 1	< 0.004	± 0.006	< 0.001	± 0.001	33	± 0
15389000	04/04/03	1 of 1	0.27	± 0.09	9.1	± 0.2	92	± 2	< 0.004	± 0.003	< 0.001	± 0.001	61	± 1
15389000	06/09/03	1 of 1	0.37	± 0.03	5.2	± 0.3	36	± 1	0.015	± 0.004	0.003	± 0.000	19	± 0
15389000	06/19/03	1 of 1	0.37	± 0.05	6.2	± 0.1	48	± 2	0.010	± 0.002	< 0.001	± 0.000	29	± 0
15389000	07/01/03	1 of 1	0.38	± 0.02	7.4	± 0.7	61	± 1	0.011	± 0.003	< 0.001	± 0.001	32	± 0
15389000	07/23/03	1 of 1	0.36	± 0.02	8.2	± 0.3	51	± 1	0.013	± 0.000	< 0.001	± 0.000	26	± 0
15389000	08/19/03	1 of 1	0.32	± 0.04	6.6	± 0.5	43	± 1	0.014	± 0.005	0.001	± 0.001	25	± 0
15389000	09/22/03	1 of 1	0.30	± 0.02	6.7	± 0.6	48	± 1	0.016	± 0.001	< 0.001	± 0.000	34	± 0
15453500	03/26/03	1 of 1	0.31	± 0.04	8.9	± 0.5	66	± 1	< 0.004	± 0.001	< 0.001	± 0.000	41	± 1
15453500	05/29/03	1 of 1	0.52	± 0.03	6.1	± 0.7	41	± 1	0.014	± 0.004	0.003	± 0.001	24	± 0
15453500	06/12/03	1 of 1	0.49	± 0.04	5.6	± 0.4	40	± 0	0.006	± 0.003	0.003	± 0.002	26	± 1
15453500	07/15/03	1 of 1	0.63	± 0.03	10	± 2	46	± 1	< 0.004	± 0.002	< 0.001	± 0.000	32	± 0
15453500	07/24/03	1 of 1	0.62	± 0.02	10	± 1	46	± 1	0.004	± 0.003	< 0.001	± 0.000	29	± 1
15453500	08/21/03	1 of 1	0.49	± 0.03	10	± 0	43	± 0	< 0.004	± 0.001	< 0.001	± 0.002	32	± 0
15453500	09/11/03	1 of 1	0.48	± 0.02	7.9	± 0.1	42	± 0	0.011	± 0.003	0.003	± 0.001	30	± 0

**Table 8.** Selected dissolved major cations and trace elements from fixed-station sampling sites in the Yukon River Basin-continued

Station ID	Date	Rep	Arsenic µg/L		Boron µg/L		Barium µg/L		Beryllium µg/L		Bismuth µg/L		Calcium mg/L	
			A	SD	A	SD	A	SD	A	SD	A	SD	A	SD
15515500	03/19/03	1 of 1	0.43	± 0.03	22	± 0	50	± 1	< 0.004	± 0.002	< 0.001	± 0.000	45	± 0
15515500	05/08/03	1 of 1	0.92	± 0.04	20	± 0	38	± 1	0.004	± 0.002	0.002	± 0.000	35	± 0
15515500	05/28/03	1 of 1	1.1	± 0.0	27	± 0	38	± 1	< 0.004	± 0.003	0.002	± 0.002	38	± 1
15515500	07/22/03	1 of 1	1.0	± 0.0	20	± 1	33	± 1	< 0.004	± 0.001	< 0.001	± 0.000	30	± 0
15515500	08/15/03	1 of 1	0.89	± 0.04	21	± 0	37	± 1	< 0.004	± 0.003	< 0.001	± 0.000	32	± 1
15515500	09/12/03	1 of 1	0.93	± 0.01	18	± 0	33	± 1	< 0.004	± 0.001	< 0.001	± 0.001	33	± 1
15565447	03/25/03	1 of 1	0.41	± 0.01	13	± 0	76	± 5	< 0.004	± 0.003	0.002	± 0.002	48	± 1
15565447	05/28/03	1 of 1	0.77	± 0.03	6.6	± 0.9	36	± 1	0.010	± 0.005	0.004	± 0.001	23	± 1
15565447	06/17/03	1 of 1	0.78	± 0.03	6.2	± 0.4	37	± 1	0.009	± 0.000	0.003	± 0.001	24	± 0
15565447	07/10/03	1 of 1	0.87	± 0.03	9.7	± 1.2	43	± 1	< 0.004	± 0.001	0.003	± 0.001	28	± 0
15565447	07/24/03	1 of 1	0.88	± 0.04	9.8	± 0.3	45	± 1	< 0.004	± 0.003	0.001	± 0.001	29	± 0
15565447	08/19/03	1 of 1	0.92	± 0.03	11	± 1	43	± 1	< 0.004	± 0.000	< 0.001	± 0.000	29	± 0
15565447	09/23/03	1 of 1	0.84	± 0.03	8.0	± 0.3	40	± 1	0.011	± 0.002	0.002	± 0.001	29	± 0

**Table 8.** Selected dissolved major cations and trace elements from fixed-station sampling sites in the Yukon River Basin-continued

Station ID	Date	Rep	Cadmium µg/L		Cerium µg/L		Cobalt µg/L		Chromium µg/L		Cesium µg/L		Copper µg/L	
			A	SD	A	SD	A	SD	A	SD	A	SD	A	SD
15356000	04/01/03	1 of 1	0.021	± 0.001	0.0042	± 0.0001	0.004	± 0.004	<0.3	± 0.2	<0.01	± 0.00	0.57	± 0.01
15356000	05/23/03	1 of 1	0.034	± 0.001	0.14	± 0.00	0.056	± 0.002	<0.3	± 0.1	<0.01	± 0.00	2.3	± 0.0
15356000	06/17/03	1 of 1	0.033	± 0.000	0.030	± 0.001	0.025	± 0.004	<0.3	± 0.1	<0.01	± 0.00	1.6	± 0.0
15356000	07/17/03	1 of 1	0.013	± 0.003	0.013	± 0.001	0.009	± 0.005	<0.3	± 0.0	<0.01	± 0.00	1.4	± 0.0
15356000	08/13/03	1 of 1	0.008	± 0.001	0.0072	± 0.0002	0.019	± 0.003	0.7	± 0.8	<0.01	± 0.00	1.0	± 0.0
15356000	09/09/03	1 of 1	0.021	± 0.003	0.019	± 0.002	0.022	± 0.000	<0.3	± 0.1	<0.01	± 0.00	1.1	± 0.0
15356000	09/24/03	1 of 1	0.015	± 0.000	0.012	± 0.001	0.014	± 0.006	<0.3	± 0.1	<0.01	± 0.00	0.76	± 0.03
15389000	04/04/03	1 of 1	0.011	± 0.000	0.0026	± 0.0003	0.030	± 0.003	0.3	± 0.1	<0.01	± 0.00	0.40	± 0.01
15389000	06/09/03	1 of 1	0.011	± 0.001	0.14	± 0.01	0.057	± 0.003	<0.3	± 0.1	<0.01	± 0.00	1.8	± 0.0
15389000	06/19/03	1 of 1	0.018	± 0.002	0.056	± 0.000	0.040	± 0.006	<0.3	± 0.2	<0.01	± 0.00	1.6	± 0.0
15389000	07/01/03	1 of 1	0.022	± 0.001	0.029	± 0.001	0.027	± 0.003	<0.3	± 0.2	<0.01	± 0.00	1.6	± 0.0
15389000	07/23/03	1 of 1	0.014	± 0.001	0.086	± 0.003	0.056	± 0.001	0.3	± 0.1	<0.01	± 0.00	2.2	± 0.0
15389000	08/19/03	1 of 1	0.011	± 0.000	0.088	± 0.001	0.058	± 0.006	<0.3	± 0.3	<0.01	± 0.00	1.4	± 0.0
15389000	09/22/03	1 of 1	0.011	± 0.003	0.061	± 0.002	0.11	± 0.00	<0.3	± 0.0	<0.01	± 0.00	1.2	± 0.0
15453500	03/26/03	1 of 1	0.011	± 0.002	0.0043	± 0.0001	0.019	± 0.002	0.3	± 0.2	<0.01	± 0.00	0.72	± 0.00
15453500	05/29/03	1 of 1	0.021	± 0.001	0.19	± 0.00	0.076	± 0.002	<0.3	± 0.1	<0.01	± 0.00	2.7	± 0.0
15453500	06/12/03	1 of 1	0.014	± 0.000	0.097	± 0.000	0.048	± 0.005	<0.3	± 0.1	<0.01	± 0.00	2.3	± 0.0
15453500	07/15/03	1 of 1	0.007	± 0.001	0.025	± 0.001	0.016	± 0.007	<0.3	± 0.1	<0.01	± 0.00	2.2	± 0.0
15453500	07/24/03	1 of 1	0.011	± 0.005	0.025	± 0.001	0.019	± 0.002	0.3	± 0.3	<0.01	± 0.00	2.1	± 0.0
15453500	08/21/03	1 of 1	0.007	± 0.001	0.020	± 0.001	0.020	± 0.008	<0.3	± 0.1	<0.01	± 0.00	1.5	± 0.0
15453500	09/11/03	1 of 1	0.009	± 0.003	0.082	± 0.001	0.044	± 0.002	<0.3	± 0.0	<0.01	± 0.00	1.8	± 0.0

**Table 8.** Selected dissolved major cations and trace elements from fixed-station sampling sites in the Yukon River Basin-continued

Station ID	Date	Rep	Cadmium µg/L		Cerium µg/L		Cobalt µg/L		Chromium µg/L		Cesium µg/L		Copper µg/L	
			A	SD	A	SD	A	SD	A	SD	A	SD	A	SD
15515500	03/19/03	1 of 1	0.015	± 0.002	0.005	± 0.0004	0.15	± 0.00	< 0.3	± 0.0	< 0.01	± 0.00	0.77	± 0.03
15515500	05/08/03	1 of 1	0.013	± 0.002	0.039	± 0.001	0.13	± 0.00	0.4	± 0.2	< 0.01	± 0.00	2.0	± 0.1
15515500	05/28/03	1 of 1	0.016	± 0.002	0.031	± 0.001	0.061	± 0.011	0.4	± 0.1	< 0.01	± 0.00	1.9	± 0.0
15515500	07/22/03	1 of 1	0.016	± 0.001	0.011	± 0.001	0.038	± 0.004	< 0.3	± 0.1	< 0.01	± 0.00	1.3	± 0.0
15515500	08/15/03	1 of 1	0.012	± 0.001	0.007	± 0.0003	0.012	± 0.002	< 0.3	± 0.1	< 0.01	± 0.00	0.64	± 0.00
15515500	09/12/03	1 of 1	0.015	± 0.001	0.042	± 0.001	0.085	± 0.004	< 0.3	± 0.1	< 0.01	± 0.00	1.4	± 0.0
15565447	03/25/03	1 of 1	0.026	± 0.001	0.013	± 0.000	0.12	± 0.00	0.3	± 0.1	< 0.01	± 0.00	0.75	± 0.03
15565447	05/28/03	1 of 1	0.024	± 0.005	0.24	± 0.01	0.082	± 0.003	0.4	± 0.1	< 0.01	± 0.00	4.2	± 0.0
15565447	06/17/03	1 of 1	0.034	± 0.005	0.19	± 0.00	0.075	± 0.005	0.3	± 0.1	< 0.01	± 0.00	4.3	± 0.1
15565447	07/10/03	1 of 1	0.008	± 0.002	0.064	± 0.000	0.029	± 0.005	< 0.3	± 0.2	< 0.01	± 0.00	2.3	± 0.1
15565447	07/24/03	1 of 1	0.010	± 0.001	0.034	± 0.001	0.019	± 0.005	0.3	± 0.2	< 0.01	± 0.00	2.3	± 0.1
15565447	08/19/03	1 of 1	0.009	± 0.002	0.060	± 0.001	0.025	± 0.005	< 0.3	± 0.1	< 0.01	± 0.00	2.9	± 0.0
15565447	09/23/03	1 of 1	0.011	± 0.001	0.11	± 0.00	0.047	± 0.006	0.3	± 0.1	< 0.01	± 0.00	2.6	± 0.0

**Table 8.** Selected dissolved major cations and trace elements from fixed-station sampling sites in the Yukon River Basin-continued

Station ID	Date	Rep	Dysprosium µg/L			Erbium µg/L			Europium µg/L			Iron µg/L			Gallium µg/L			Gadolinium µg/L		
			A	SD		A	SD		A	SD		A	SD		A	SD		A	SD	
15356000	04/01/03	1 of 1	0.0022	± 0.0007	0.0015	± 0.0005	0.0010	± 0.0016	4.4	± 0.1	0.0049	± 0.0010	0.0022	± 0.0006						
15356000	05/23/03	1 of 1	0.028	± 0.000	0.016	± 0.000	0.0055	± 0.0005	88	± 1	0.0082	± 0.0005	0.030	± 0.000						
15356000	06/17/03	1 of 1	0.0067	± 0.0013	0.0034	± 0.0006	0.0024	± 0.0001	19	± 2	0.013	± 0.001	0.0066	± 0.0002						
15356000	07/17/03	1 of 1	0.0029	± 0.0003	0.0024	± 0.0000	0.0003	± 0.0011	5.7	± 0.9	0.028	± 0.003	0.0028	± 0.0005						
15356000	08/13/03	1 of 1	0.0021	± 0.0007	0.0018	± 0.0001	0.0003	± 0.0006	3.1	± 0.3	0.020	± 0.000	0.0021	± 0.0003						
15356000	09/09/03	1 of 1	0.0062	± 0.0003	0.0034	± 0.0001	0.0012	± 0.0007	11	± 1	0.0086	± 0.0005	0.0047	± 0.0007						
15356000	09/24/03	1 of 1	0.0039	± 0.0009	0.0028	± 0.0003	0.0004	± 0.0007	10	± 1	0.0071	± 0.0010	0.0035	± 0.0008						
15389000	04/04/03	1 of 1	0.0020	± 0.0003	0.0012	± 0.0003	0.0015	± 0.0004	10	± 0	0.0027	± 0.0007	0.0024	± 0.0004						
15389000	06/09/03	1 of 1	0.039	± 0.001	0.019	± 0.002	0.0091	± 0.0012	179	± 2	0.0077	± 0.0004	0.042	± 0.001						
15389000	06/19/03	1 of 1	0.020	± 0.001	0.011	± 0.001	0.0037	± 0.0005	119	± 2	0.0058	± 0.0007	0.022	± 0.000						
15389000	07/01/03	1 of 1	0.014	± 0.000	0.0078	± 0.0007	0.0021	± 0.0011	59	± 0	0.0061	± 0.0004	0.013	± 0.000						
15389000	07/23/03	1 of 1	0.042	± 0.000	0.022	± 0.001	0.0097	± 0.0012	166	± 4	0.0054	± 0.0007	0.043	± 0.000						
15389000	08/19/03	1 of 1	0.038	± 0.000	0.020	± 0.001	0.0075	± 0.0012	115	± 3	0.0052	± 0.0006	0.038	± 0.002						
15389000	09/22/03	1 of 1	0.030	± 0.001	0.017	± 0.001	0.0062	± 0.0007	128	± 3	0.0040	± 0.0005	0.030	± 0.001						
15453500	03/26/03	1 of 1	0.0017	± 0.0003	0.0013	± 0.0006	0.0032	± 0.0002	8.3	± 0.7	0.0035	± 0.0008	0.0016	± 0.0005						
15453500	05/29/03	1 of 1	0.046	± 0.000	0.025	± 0.000	0.011	± 0.001	173	± 2	0.0086	± 0.0008	0.049	± 0.001						
15453500	06/12/03	1 of 1	0.018	± 0.001	0.0100	± 0.0007	0.0044	± 0.0008	68	± 2	0.012	± 0.001	0.018	± 0.000						
15453500	07/15/03	1 of 1	0.0066	± 0.0010	0.0048	± 0.0003	0.0007	± 0.0011	11	± 1	0.022	± 0.001	0.0064	± 0.0007						
15453500	07/24/03	1 of 1	0.0074	± 0.0008	0.0041	± 0.0003	0.0011	± 0.0011	19	± 1	0.026	± 0.000	0.0075	± 0.0001						
15453500	08/21/03	1 of 1	0.0073	± 0.0009	0.0044	± 0.0005	0.0010	± 0.0001	16	± 1	0.018	± 0.001	0.0074	± 0.0006						
15453500	09/11/03	1 of 1	0.022	± 0.000	0.014	± 0.002	0.0048	± 0.0008	74	± 0	0.0074	± 0.0007	0.021	± 0.001						

**Table 8.** Selected dissolved major cations and trace elements from fixed-station sampling sites in the Yukon River Basin-continued

Station ID	Date	Rep	Dysprosium		Erbium		Europium		Iron		Gallium		Gadolinium	
			A	SD	A	SD	A	SD	A	SD	A	SD	A	SD
15515500	03/19/03	1 of 1	0.0019	± 0.0003	0.0017	± 0.0004	0.0009	± 0.0004	29	± 1	0.0056	± 0.0002	0.0018	± 0.0004
15515500	05/08/03	1 of 1	0.0068	± 0.0005	0.0050	± 0.0003	0.0017	± 0.0008	65	± 1	0.0082	± 0.0006	0.0059	± 0.0005
15515500	05/28/03	1 of 1	0.0061	± 0.0005	0.0052	± 0.0002	0.0007	± 0.0004	79	± 2	0.015	± 0.001	0.0053	± 0.0011
15515500	07/22/03	1 of 1	0.0023	± 0.0007	0.0020	± 0.0004	0.0005	± 0.0005	3.4	± 0.2	0.033	± 0.002	0.0020	± 0.0002
15515500	08/15/03	1 of 1	0.0016	± 0.0005	0.0010	± 0.0005	< 0.0002	± 0.0005	4.8	± 1.0	0.034	± 0.003	0.0013	± 0.0001
15515500	09/12/03	1 of 1	0.0087	± 0.0005	0.0054	± 0.0013	0.0020	± 0.0002	60	± 1	0.015	± 0.001	0.0078	± 0.0002
15565447	03/25/03	1 of 1	0.0038	± 0.0006	0.0028	± 0.0004	0.0010	± 0.0011	118	± 2	0.0030	± 0.0004	0.0030	± 0.0002
15565447	05/28/03	1 of 1	0.046	± 0.002	0.026	± 0.001	0.0096	± 0.0016	306	± 3	0.011	± 0.000	0.046	± 0.002
15565447	06/17/03	1 of 1	0.032	± 0.001	0.020	± 0.001	0.0087	± 0.0003	189	± 5	0.016	± 0.001	0.035	± 0.004
15565447	07/10/03	1 of 1	0.011	± 0.001	0.0065	± 0.0008	0.0027	± 0.0009	121	± 2	0.018	± 0.001	0.012	± 0.000
15565447	07/24/03	1 of 1	0.0078	± 0.0000	0.0038	± 0.0004	0.0020	± 0.0007	40	± 1	0.018	± 0.000	0.0064	± 0.0006
15565447	08/19/03	1 of 1	0.012	± 0.000	0.0071	± 0.0006	0.0027	± 0.0011	101	± 2	0.018	± 0.001	0.010	± 0.000
15565447	09/23/03	1 of 1	0.022	± 0.001	0.013	± 0.000	0.0053	± 0.0008	231	± 2	0.012	± 0.001	0.023	± 0.002

**Table 8.** Selected dissolved major cations and trace elements from fixed-station sampling sites in the Yukon River Basin-continued

Station ID	Date	Rep	Holmium µg/L			Potassium mg/L			Lanthanum µg/L			Lithium µg/L			Lutetium µg/L			Magnesium mg/L		
			A	SD		A	SD		A	SD		A	SD		A	SD		A	SD	
15356000	04/01/03	1 of 1	0.0006	± 0.0001	1.1	± 0.0	0.0059	± 0.0004	2.5	± 0.1	0.0003	± 0.0001		10	± 0					
15356000	05/23/03	1 of 1	0.0055	± 0.0002	1.0	± 0.0	0.089	± 0.000	2.4	± 0.1	0.0024	± 0.0001		8.1	± 0.2					
15356000	06/17/03	1 of 1	0.0013	± 0.0002	0.93	± 0.02	0.018	± 0.001	2.6	± 0.1	0.0006	± 0.0001		8.2	± 0.1					
15356000	07/17/03	1 of 1	0.0008	± 0.0001	1.6	± 0.0	0.0079	± 0.0002	3.3	± 0.0	0.0005	± 0.0002		8.6	± 0.1					
15356000	08/13/03	1 of 1	0.0007	± 0.0002	1.4	± 0.0	0.0047	± 0.0004	3.1	± 0.0	0.0005	± 0.0002		8.8	± 0.2					
15356000	09/09/03	1 of 1	0.0011	± 0.0000	1.1	± 0.0	0.013	± 0.001	3.3	± 0.0	0.0006	± 0.0001		9.7	± 0.1					
15356000	09/24/03	1 of 1	0.0009	± 0.0001	0.98	± 0.02	0.0088	± 0.0007	2.7	± 0.1	0.0004	± 0.0001		9.6	± 0.1					
15389000	04/04/03	1 of 1	0.0005	± 0.0001	0.61	± 0.02	0.0028	± 0.0003	7.2	± 0.1	0.0003	± 0.0000		13	± 0					
15389000	06/09/03	1 of 1	0.0073	± 0.0002	0.59	± 0.01	0.072	± 0.001	2.3	± 0.1	0.0026	± 0.0002		3.6	± 0.0					
15389000	06/19/03	1 of 1	0.0037	± 0.0001	0.61	± 0.00	0.033	± 0.001	3.5	± 0.1	0.0011	± 0.0000		5.4	± 0.1					
15389000	07/01/03	1 of 1	0.0027	± 0.0002	0.64	± 0.01	0.018	± 0.000	4.7	± 0.0	0.0011	± 0.0001		6.5	± 0.2					
15389000	07/23/03	1 of 1	0.0080	± 0.0002	0.46	± 0.01	0.041	± 0.002	4.4	± 0.1	0.0028	± 0.0001		6.0	± 0.1					
15389000	08/19/03	1 of 1	0.0074	± 0.0006	0.43	± 0.02	0.040	± 0.001	4.2	± 0.1	0.0025	± 0.0002		6.3	± 0.1					
15389000	09/22/03	1 of 1	0.0059	± 0.0001	0.41	± 0.02	0.032	± 0.001	4.7	± 0.1	0.0025	± 0.0003		7.1	± 0.2					
15453500	03/26/03	1 of 1	0.0005	± 0.0002	1.1	± 0.0	0.0047	± 0.0004	3.2	± 0.1	0.0002	± 0.0001		10	± 0					
15453500	05/29/03	1 of 1	0.0093	± 0.0006	0.98	± 0.01	0.11	± 0.00	2.6	± 0.1	0.0031	± 0.0001		6.0	± 0.1					
15453500	06/12/03	1 of 1	0.0036	± 0.0002	0.79	± 0.03	0.056	± 0.000	2.5	± 0.0	0.0014	± 0.0001		6.3	± 0.1					
15453500	07/15/03	1 of 1	0.0015	± 0.0001	1.3	± 0.0	0.016	± 0.000	3.2	± 0.1	0.0007	± 0.0001		8.3	± 0.1					
15453500	07/24/03	1 of 1	0.0016	± 0.0001	1.4	± 0.0	0.015	± 0.000	3.8	± 0.0	0.0008	± 0.0001		7.9	± 0.1					
15453500	08/21/03	1 of 1	0.0015	± 0.0003	1.1	± 0.0	0.011	± 0.000	3.5	± 0.1	0.0005	± 0.0000		7.9	± 0.1					
15453500	09/11/03	1 of 1	0.0044	± 0.0001	0.82	± 0.01	0.048	± 0.001	3.4	± 0.1	0.0021	± 0.0002		7.6	± 0.1					



**Table 8.** Selected dissolved major cations and trace elements from fixed-station sampling sites in the Yukon River Basin-continued

Station ID	Date	Rep	Holmium µg/L		Potassium mg/L		Lanthanum µg/L		Lithium µg/L		Lutetium µg/L		Magnesium mg/L	
			A	SD	A	SD	A	SD	A	SD	A	SD	A	SD
15515500	03/19/03	1 of 1	0.0005	± 0.0000	2.4	± 0.0	0.0034	± 0.0004	3.0	± 0.0	0.0004	± 0.0002	9.6	± 0.2
15515500	05/08/03	1 of 1	0.0016	± 0.0002	1.8	± 0.0	0.023	± 0.000	2.7	± 0.1	0.0009	± 0.0002	7.9	± 0.1
15515500	05/28/03	1 of 1	0.0013	± 0.0002	2.0	± 0.0	0.021	± 0.001	3.9	± 0.1	0.0009	± 0.0001	8.8	± 0.1
15515500	07/22/03	1 of 1	0.0005	± 0.0000	2.1	± 0.0	0.0074	± 0.0002	4.8	± 0.1	0.0003	± 0.0000	7.0	± 0.1
15515500	08/15/03	1 of 1	0.0004	± 0.0002	2.8	± 0.0	0.0054	± 0.0004	5.0	± 0.0	0.0003	± 0.0002	7.1	± 0.1
15515500	09/12/03	1 of 1	0.0019	± 0.0002	1.6	± 0.0	0.025	± 0.001	3.5	± 0.0	0.0010	± 0.0001	8.1	± 0.1
15565447	03/25/03	1 of 1	0.0007	± 0.0001	1.4	± 0.0	0.0073	± 0.0002	3.3	± 0.1	0.0006	± 0.0001	11	± 0
15565447	05/28/03	1 of 1	0.0091	± 0.0001	1.0	± 0.0	0.13	± 0.01	1.9	± 0.0	0.0041	± 0.0001	5.1	± 0.2
15565447	06/17/03	1 of 1	0.0069	± 0.0006	0.90	± 0.01	0.10	± 0.00	2.0	± 0.0	0.0030	± 0.0001	5.0	± 0.1
15565447	07/10/03	1 of 1	0.0024	± 0.0001	1.1	± 0.0	0.039	± 0.000	2.7	± 0.1	0.0010	± 0.0001	7.1	± 0.1
15565447	07/24/03	1 of 1	0.0015	± 0.0002	1.3	± 0.0	0.021	± 0.002	3.0	± 0.1	0.0007	± 0.0001	7.4	± 0.1
15565447	08/19/03	1 of 1	0.0022	± 0.0000	1.3	± 0.0	0.035	± 0.001	3.0	± 0.0	0.0012	± 0.0001	7.3	± 0.1
15565447	09/23/03	1 of 1	0.0050	± 0.0000	0.88	± 0.02	0.068	± 0.001	2.6	± 0.1	0.0018	± 0.0000	7.6	± 0.1

**Table 8.** Selected dissolved major cations and trace elements from fixed-station sampling sites in the Yukon River Basin-continued

Station ID	Date	Rep	Manganese µg/L		Molybdenum µg/L		Sodium mg/L		Neodymium µg/L		Nickel µg/L		Phosphorus mg/L		Lead µg/L	
			A	SD	A	SD	A	SD	A	SD	A	SD	A	SD	A	SD
15356000	04/01/03	1 of 1	1.7	± 0.1	1.2	± 0.0	2.6	± 0.1	0.0069	± 0.000	0.74	± 0.15	< 7	± 2	0.009	± 0.005
15356000	05/23/03	1 of 1	8.4	± 0.1	0.83	± 0.04	2.0	± 0.1	0.10	± 0.00	2.2	± 0.2	< 7	± 5	0.045	± 0.002
15356000	06/17/03	1 of 1	2.4	± 0.1	0.93	± 0.03	1.7	± 0.1	0.022	± 0.000	1.4	± 0.1	< 7	± 4	0.028	± 0.005
15356000	07/17/03	1 of 1	0.6	± 0.1	1.3	± 0.0	2.5	± 0.1	0.010	± 0.001	0.76	± 0.12	< 7	± 5	0.022	± 0.004
15356000	08/13/03	1 of 1	2.1	± 0.0	1.4	± 0.0	2.6	± 0.1	0.0061	± 0.000	0.63	± 0.10	< 7	± 3	<	± 0.001
15356000	09/09/03	1 of 1	1.9	± 0.0	1.2	± 0.1	2.4	± 0.1	0.017	± 0.001	1.1	± 0.0	< 7	± 4	0.016	± 0.010
15356000	09/24/03	1 of 1	3.9	± 0.1	1.1	± 0.0	2.2	± 0.1	0.010	± 0.002	1.2	± 0.2	< 7	± 1	0.009	± 0.004
15389000	04/04/03	1 of 1	14	± 0	0.65	± 0.01	4.9	± 0.1	0.0038	± 0.000	1.2	± 0.0	< 7	± 4	0.046	± 0.006
15389000	06/09/03	1 of 1	2.8	± 0.3	0.35	± 0.09	1.1	± 0.0	0.12	± 0.01	2.0	± 0.0	8	± 2	0.12	± 0.00
15389000	06/19/03	1 of 1	2.1	± 0.0	0.45	± 0.06	1.8	± 0.0	0.056	± 0.005	1.9	± 0.1	< 7	± 2	0.11	± 0.00
15389000	07/01/03	1 of 1	1.9	± 0.1	0.49	± 0.01	2.9	± 0.0	0.033	± 0.001	1.6	± 0.2	< 7	± 2	0.050	± 0.001
15389000	07/23/03	1 of 1	3.3	± 0.2	0.36	± 0.00	2.1	± 0.1	0.099	± 0.001	2.8	± 0.1	< 7	± 4	0.079	± 0.007
15389000	08/19/03	1 of 1	3.6	± 0.4	0.28	± 0.02	1.8	± 0.1	0.088	± 0.004	2.1	± 0.1	< 7	± 2	0.056	± 0.002
15389000	09/22/03	1 of 1	5.6	± 0.0	0.41	± 0.03	2.3	± 0.1	0.065	± 0.001	2.7	± 0.1	< 7	± 2	0.034	± 0.002
15453500	03/26/03	1 of 1	8.1	± 0.0	1.2	± 0.0	2.8	± 0.1	0.0057	± 0.000	1.0	± 0.3	< 7	± 2	0.018	± 0.002
15453500	05/29/03	1 of 1	8.2	± 1.0	0.53	± 0.01	1.7	± 0.0	0.15	± 0.00	2.4	± 0.1	< 7	± 3	0.066	± 0.001
15453500	06/12/03	1 of 1	5.0	± 0.1	0.60	± 0.04	1.5	± 0.1	0.064	± 0.002	1.6	± 0.0	< 7	± 4	0.060	± 0.004
15453500	07/15/03	1 of 1	1.2	± 0.1	1.1	± 0.1	2.5	± 0.1	0.020	± 0.001	0.81	± 0.00	< 7	± 1	0.007	± 0.003
15453500	07/24/03	1 of 1	1.1	± 0.1	1.1	± 0.0	2.5	± 0.1	0.020	± 0.003	1.0	± 0.1	< 7	± 3	0.010	± 0.000
15453500	08/21/03	1 of 1	1.4	± 0.0	0.95	± 0.02	2.4	± 0.1	0.020	± 0.000	0.98	± 0.12	< 7	± 4	0.007	± 0.000
15453500	09/11/03	1 of 1	3.5	± 0.0	0.77	± 0.03	2.1	± 0.0	0.066	± 0.002	1.5	± 0.0	< 7	± 2	0.041	± 0.008

**Table 8.** Selected dissolved major cations and trace elements from fixed-station sampling sites in the Yukon River Basin-continued

Station	Date	Rep	Manganese µg/L		Molybdenum µg/L		Sodium mg/L		Neodymium µg/L		Nickel µg/L		Phosphorus mg/L		Lead µg/L	
			A	SD	A	SD	A	SD	A	SD	A	SD	A	SD	A	SD
15515500	03/19/03	1 of 1	95	± 2	1.2	± 0.1	4.1	± 0.1	0.0047	± 0.0011	0.78	± 0.07	< 7	± 4	0.0	± 0.005
15515500	05/08/03	1 of 1	39	± 0	1.00	± 0.03	3.3	± 0.0	0.027	± 0.001	1.1	± 0.2	< 7	± 6	0.0	± 0.004
15515500	05/28/03	1 of 1	21	± 0	1.2	± 0.0	4.1	± 0.0	0.023	± 0.002	0.72	± 0.18	< 7	± 2	0.0	± 0.002
15515500	07/22/03	1 of 1	5.6	± 0.1	1.2	± 0.0	3.1	± 0.1	0.0084	± 0.0010	0.75	± 0.14	< 7	± 6	0.0	± 0.007
15515500	08/15/03	1 of 1	1.2	± 0.1	1.3	± 0.0	3.0	± 0.1	0.0054	± 0.0006	0.69	± 0.12	< 7	± 6	0.0	± 0.004
15515500	09/12/03	1 of 1	23	± 0	0.98	± 0.04	3.3	± 0.1	0.030	± 0.001	1.0	± 0.1	< 7	± 2	0.0	± 0.004
15565447	03/25/03	1 of 1	103	± 2	0.90	± 0.10	3.4	± 0.1	0.010	± 0.000	0.96	± 0.23	< 7	± 5	0.0	± 0.016
15565447	05/28/03	1 of 1	15	± 1	0.57	± 0.09	1.8	± 0.1	0.16	± 0.00	1.8	± 0.1	11	± 5	0.2	± 0.00
15565447	06/17/03	1 of 1	14	± 0	0.56	± 0.05	1.4	± 0.0	0.12	± 0.00	1.7	± 0.1	17	± 1	0.2	± 0.00
15565447	07/10/03	1 of 1	3.5	± 0.1	0.91	± 0.03	2.3	± 0.1	0.042	± 0.001	0.83	± 0.14	8	± 1	0.0	± 0.002
15565447	07/24/03	1 of 1	2.2	± 0.1	1.0	± 0.0	2.4	± 0.0	0.027	± 0.000	0.63	± 0.17	< 7	± 3	0.0	± 0.004
15565447	08/19/03	1 of 1	3.1	± 0.1	0.93	± 0.05	2.6	± 0.0	0.041	± 0.001	0.78	± 0.09	11	± 2	0.2	± 0.00
15565447	09/23/03	1 of 1	7.2	± 0.3	0.72	± 0.06	2.2	± 0.0	0.081	± 0.000	1.2	± 0.1	11	± 5	0.0	± 0.001

**Table 8.** Selected dissolved major cations and trace elements from fixed-station sampling sites in the Yukon River Basin-continued

Station ID	Date	Rep	Praseodymium µg/L		Rubidium µg/L		Rhenium µg/L		Sulfur mg/L		Antimony µg/L		Selenium µg/L		Silica mg/L	
			A	SD	A	SD	A	SD	A	SD	A	SD	A	SD	A	SD
15356000	04/01/03	1 of 1	0.0014	± 0.0001	0.84	± 0.00	0.0028	± 0.0002	14	± 0	0.10	± 0.01	0.40	± 0.15	6.9	± 0.1
15356000	05/23/03	1 of 1	0.024	± 0.000	0.82	± 0.01	0.0024	± 0.0001	12	± 0	0.12	± 0.00	0.37	± 0.06	5.7	± 0.1
15356000	06/17/03	1 of 1	0.0049	± 0.0002	0.96	± 0.01	0.0024	± 0.0001	14	± 0	0.17	± 0.01	0.52	± 0.17	5.3	± 0.2
15356000	07/17/03	1 of 1	0.0019	± 0.0002	2.1	± 0.0	0.0028	± 0.0004	14	± 0	0.22	± 0.01	0.52	± 0.17	6.1	± 0.2
15356000	08/13/03	1 of 1	0.0013	± 0.0001	1.7	± 0.0	0.0033	± 0.0003	14	± 0	0.18	± 0.00	0.54	± 0.11	6.1	± 0.2
15356000	09/09/03	1 of 1	0.0035	± 0.0002	1.1	± 0.0	0.0028	± 0.0004	17	± 0	0.15	± 0.00	0.36	± 0.03	6.0	± 0.2
15356000	09/24/03	1 of 1	0.0024	± 0.0002	0.81	± 0.00	0.0029	± 0.0000	16	± 0	0.12	± 0.00	0.49	± 0.16	5.9	± 0.1
15389000	04/04/03	1 of 1	0.0006	± 0.0001	0.36	± 0.00	0.0029	± 0.0002	13	± 0	0.057	± 0.005	0.47	± 0.19	4.5	± 0.1
15389000	06/09/03	1 of 1	0.025	± 0.001	0.25	± 0.00	0.0013	± 0.0002	5.7	± 0.1	0.069	± 0.002	0.23	± 0.14	2.4	± 0.1
15389000	06/19/03	1 of 1	0.011	± 0.000	0.27	± 0.01	0.0023	± 0.0002	8.7	± 0.2	0.093	± 0.009	0.19	± 0.14	2.9	± 0.1
15389000	07/01/03	1 of 1	0.0065	± 0.0001	0.35	± 0.00	0.0023	± 0.0002	11	± 0	0.097	± 0.005	0.20	± 0.09	2.8	± 0.1
15389000	07/23/03	1 of 1	0.019	± 0.000	0.27	± 0.00	0.0012	± 0.0001	12	± 0	0.086	± 0.005	0.14	± 0.03	3.7	± 0.1
15389000	08/19/03	1 of 1	0.016	± 0.000	0.21	± 0.00	0.0010	± 0.0001	14	± 0	0.071	± 0.003	0.25	± 0.06	3.7	± 0.1
15389000	09/22/03	1 of 1	0.012	± 0.000	0.17	± 0.00	0.0018	± 0.0002	13	± 0	0.066	± 0.001	0.17	± 0.03	3.9	± 0.1
15453500	03/26/03	1 of 1	0.0011	± 0.0001	0.88	± 0.01	0.0027	± 0.0000	14	± 1	0.093	± 0.001	0.36	± 0.10	6.8	± 0.0
15453500	05/29/03	1 of 1	0.034	± 0.000	0.66	± 0.01	0.0018	± 0.0003	8.8	± 0.2	0.097	± 0.006	0.29	± 0.10	4.1	± 0.1
15453500	06/12/03	1 of 1	0.015	± 0.001	0.67	± 0.01	0.0024	± 0.0001	10	± 0	0.13	± 0.01	0.25	± 0.15	4.2	± 0.1
15453500	07/15/03	1 of 1	0.0044	± 0.0003	1.5	± 0.0	0.0026	± 0.0002	13	± 1	0.18	± 0.00	0.48	± 0.15	6.4	± 0.0
15453500	07/24/03	1 of 1	0.0040	± 0.0002	1.8	± 0.0	0.0026	± 0.0001	14	± 0	0.20	± 0.00	0.48	± 0.08	5.5	± 0.1
15453500	08/21/03	1 of 1	0.0034	± 0.0002	1.2	± 0.0	0.0025	± 0.0003	14	± 0	0.15	± 0.01	0.41	± 0.10	5.1	± 0.1
15453500	09/11/03	1 of 1	0.015	± 0.000	0.77	± 0.01	0.0026	± 0.0001	13	± 0	0.13	± 0.01	0.28	± 0.07	5.7	± 0.1

**Table 8.** Selected dissolved major cations and trace elements from fixed-station sampling sites in the Yukon River Basin-continued

Station ID	Date	Rep	Praseodymium µg/L		Rubidium µg/L		Rhenium µg/L		Sulfur mg/L		Antimony µg/L		Selenium µg/L		Silica mg/L	
			A	SD	A	SD	A	SD	A	SD	A	SD	A	SD	A	SD
15515500	03/19/03	1 of 1	0.0009	± 0.0001	1.3	± 0.0	0.0031	± 0.0002	14	± 0	0.16	± 0.00	0.53	± 0.17	15	± 0
15515500	05/08/03	1 of 1	0.0055	± 0.0002	1.6	± 0.0	0.0028	± 0.0003	14	± 0	0.20	± 0.00	0.47	± 0.13	10	± 0
15515500	05/28/03	1 of 1	0.0052	± 0.0003	1.6	± 0.0	0.0032	± 0.0001	15	± 0	0.21	± 0.01	0.67	± 0.15	11	± 0
15515500	07/22/03	1 of 1	0.0017	± 0.0004	2.8	± 0.0	0.0035	± 0.0004	15	± 0	0.42	± 0.01	0.59	± 0.08	6.5	± 0.2
15515500	08/15/03	1 of 1	0.0011	± 0.0001	4.0	± 0.0	0.0039	± 0.0007	16	± 0	0.57	± 0.01	0.76	± 0.15	6.2	± 0.1
15515500	09/12/03	1 of 1	0.0067	± 0.0001	1.7	± 0.0	0.0030	± 0.0002	14	± 0	0.23	± 0.01	0.46	± 0.04	9.5	± 0.1
15565447	03/25/03	1 of 1	0.0020	± 0.0004	1.4	± 0.0	0.0024	± 0.0005	12	± 0	0.12	± 0.00	0.52	± 0.13	12	± 0
15565447	05/28/03	1 of 1	0.036	± 0.001	0.89	± 0.01	0.0016	± 0.0003	7.2	± 0.3	0.17	± 0.01	0.30	± 0.11	4.9	± 0.2
15565447	06/17/03	1 of 1	0.027	± 0.000	0.96	± 0.00	0.0016	± 0.0002	6.9	± 0.2	0.21	± 0.01	<0.1	± 0.1	4.5	± 0.1
15565447	07/10/03	1 of 1	0.0099	± 0.0007	1.3	± 0.0	0.0025	± 0.0002	11	± 0	0.23	± 0.01	0.38	± 0.11	6.4	± 0.2
15565447	07/24/03	1 of 1	0.0053	± 0.0003	1.4	± 0.0	0.0025	± 0.0002	13	± 0	0.26	± 0.00	0.47	± 0.15	6.2	± 0.1
15565447	08/19/03	1 of 1	0.0093	± 0.0003	1.4	± 0.0	0.0023	± 0.0007	12	± 0	0.26	± 0.00	0.42	± 0.14	6.8	± 0.1
15565447	09/23/03	1 of 1	0.018	± 0.000	0.86	± 0.01	0.0021	± 0.0001	12	± 0	0.18	± 0.01	0.34	± 0.09	7.0	± 0.1

**Table 8.** Selected dissolved major cations and trace elements from fixed-station sampling sites in the Yukon River Basin-continued

Station ID	Date	Rep	Samarium µg/L			Strontium µg/L			Terbium µg/L			Tellurium µg/L			Thorium µg/L			Thallium µg/L		
			A	SD	A	SD	A	SD	A	SD	A	SD	A	SD	A	SD	A	SD	A	SD
15356000	04/01/03	1 of 1	< 0.001	± 0.000	172	± 4	0.0004	± 0.0001	< 0.009	± 0.002	0.0016	± 0.0008	< 0.004	± 0.001	± 0.0012	< 0.004	± 0.001	± 0.001	< 0.004	± 0.001
15356000	05/23/03	1 of 1	0.025	± 0.002	137	± 2	0.0048	± 0.0002	< 0.009	± 0.005	0.022	± 0.001	< 0.004	± 0.001	± 0.001	± 0.001	± 0.001	± 0.003	± 0.003	± 0.003
15356000	06/17/03	1 of 1	0.006	± 0.001	132	± 1	0.0012	± 0.0001	< 0.009	± 0.005	0.0057	± 0.0009	0.012	± 0.001	± 0.0009	± 0.001	± 0.010	± 0.010	± 0.010	± 0.010
15356000	07/17/03	1 of 1	0.003	± 0.001	145	± 0	0.0005	± 0.0002	< 0.009	± 0.001	0.0028	± 0.0007	0.007	± 0.001	± 0.0007	± 0.001	± 0.000	± 0.000	± 0.000	± 0.000
15356000	08/13/03	1 of 1	0.002	± 0.002	157	± 0	0.0005	± 0.0001	< 0.009	± 0.003	0.0018	± 0.0008	< 0.004	± 0.001	± 0.0008	± 0.001	± 0.001	± 0.001	± 0.001	± 0.001
15356000	09/09/03	1 of 1	0.006	± 0.002	164	± 2	0.0008	± 0.0001	< 0.009	± 0.003	0.0045	± 0.0011	0.021	± 0.001	± 0.0011	± 0.001	± 0.001	± 0.001	± 0.001	± 0.001
15356000	09/24/03	1 of 1	0.003	± 0.001	161	± 1	0.0006	± 0.0001	< 0.009	± 0.004	0.0028	± 0.0001	< 0.004	± 0.001	± 0.0001	< 0.004	± 0.001	± 0.001	± 0.001	± 0.001
15389000	04/04/03	1 of 1	0.002	± 0.001	162	± 1	0.0003	± 0.0002	< 0.009	± 0.005	0.0015	± 0.0012	< 0.004	± 0.001	± 0.0012	< 0.004	± 0.001	± 0.001	± 0.001	± 0.001
15389000	06/09/03	1 of 1	0.032	± 0.001	58	± 0	0.0063	± 0.0001	< 0.009	± 0.002	0.043	± 0.001	0.009	± 0.001	± 0.001	± 0.009	± 0.009	± 0.009	± 0.009	± 0.009
15389000	06/19/03	1 of 1	0.018	± 0.001	88	± 1	0.0036	± 0.0001	< 0.009	± 0.005	0.019	± 0.001	< 0.004	± 0.001	± 0.001	< 0.004	± 0.001	± 0.005	± 0.005	± 0.005
15389000	07/01/03	1 of 1	0.009	± 0.001	103	± 1	0.0020	± 0.0002	< 0.009	± 0.001	0.012	± 0.001	0.005	± 0.001	± 0.001	± 0.005	± 0.005	± 0.005	± 0.005	± 0.005
15389000	07/23/03	1 of 1	0.033	± 0.001	94	± 3	0.0072	± 0.0002	< 0.009	± 0.006	0.039	± 0.001	< 0.004	± 0.001	± 0.001	< 0.004	± 0.001	± 0.000	± 0.000	± 0.000
15389000	08/19/03	1 of 1	0.027	± 0.001	96	± 0	0.0066	± 0.0001	< 0.009	± 0.001	0.028	± 0.000	< 0.004	± 0.001	± 0.000	< 0.004	± 0.001	± 0.001	± 0.001	± 0.001
15389000	09/22/03	1 of 1	0.022	± 0.001	110	± 2	0.0050	± 0.0001	< 0.009	± 0.003	0.029	± 0.000	< 0.004	± 0.001	± 0.000	< 0.004	± 0.001	± 0.001	± 0.001	± 0.001
15453500	03/26/03	1 of 1	< 0.001	± 0.001	177	± 1	0.0003	± 0.0002	< 0.009	± 0.004	0.0015	± 0.0004	< 0.004	± 0.001	± 0.0004	< 0.004	± 0.001	± 0.004	± 0.004	± 0.004
15453500	05/29/03	1 of 1	0.043	± 0.003	99	± 2	0.0076	± 0.0002	< 0.009	± 0.001	0.043	± 0.001	0.006	± 0.001	± 0.001	± 0.006	± 0.006	± 0.005	± 0.005	± 0.005
15453500	06/12/03	1 of 1	0.014	± 0.001	101	± 1	0.0027	± 0.0001	< 0.009	± 0.001	0.015	± 0.001	0.006	± 0.001	± 0.001	± 0.006	± 0.006	± 0.005	± 0.005	± 0.005
15453500	07/15/03	1 of 1	0.006	± 0.001	136	± 1	0.0011	± 0.0003	< 0.009	± 0.002	0.0055	± 0.0007	0.008	± 0.001	± 0.0007	± 0.008	± 0.008	± 0.002	± 0.002	± 0.002
15453500	07/24/03	1 of 1	0.006	± 0.001	133	± 1	0.0013	± 0.0002	< 0.009	± 0.003	0.0066	± 0.0012	0.006	± 0.001	± 0.0012	± 0.006	± 0.006	± 0.001	± 0.001	± 0.001
15453500	08/21/03	1 of 1	0.006	± 0.002	132	± 2	0.0009	± 0.0003	< 0.009	± 0.006	0.0050	± 0.0003	0.004	± 0.001	± 0.0003	± 0.004	± 0.004	± 0.003	± 0.003	± 0.003
15453500	09/11/03	1 of 1	0.018	± 0.001	127	± 0	0.0033	± 0.0003	< 0.009	± 0.001	0.028	± 0.001	0.004	± 0.001	± 0.001	± 0.004	± 0.004	± 0.002	± 0.002	± 0.002

**Table 8.** Selected dissolved major cations and trace elements from fixed-station sampling sites in the Yukon River Basin-continued

Station ID	Date	Rep	Samarium µg/L		Strontium µg/L		Terbium µg/L		Tellurium µg/L		Thorium µg/L		Thallium µg/L	
			A	SD	A	SD	A	SD	A	SD	A	SD	A	SD
15515500	03/19/03	1 of 1	< 0.001	± 0.001	207 ± 4	0.0002	± 0.0002	± 0.0001	< 0.009	± 0.001	0.0022	± 0.0008	0.006 ± 0.004	
15515500	05/08/03	1 of 1	0.005	± 0.002	156 ± 2	0.0012	± 0.0012	± 0.0002	< 0.009	± 0.002	0.0068	± 0.0005	< 0.004 ± 0.001	
15515500	05/28/03	1 of 1	0.006	± 0.002	173 ± 2	0.0009	± 0.0009	± 0.0002	< 0.009	± 0.005	0.0057	± 0.0006	0.005 ± 0.001	
15515500	07/22/03	1 of 1	0.003	± 0.001	134 ± 1	0.0004	± 0.0004	± 0.0002	< 0.009	± 0.004	0.0024	± 0.0005	0.007 ± 0.000	
15515500	08/15/03	1 of 1	< 0.001	± 0.001	142 ± 1	0.0003	± 0.0003	± 0.0001	< 0.009	± 0.003	0.0017	± 0.0010	0.006 ± 0.002	
15515500	09/12/03	1 of 1	0.008	± 0.002	153 ± 2	0.0014	± 0.0014	± 0.0001	< 0.009	± 0.006	0.010	± 0.001	0.006 ± 0.001	
15565447	03/25/03	1 of 1	0.003	± 0.000	202 ± 1	0.0006	± 0.0006	± 0.0001	< 0.009	± 0.004	0.0035	± 0.0004	0.005 ± 0.004	
15565447	05/28/03	1 of 1	0.043	± 0.000	92 ± 1	0.0074	± 0.0074	± 0.0001	< 0.009	± 0.005	0.035	± 0.002	< 0.004 ± 0.001	
15565447	06/17/03	1 of 1	0.032	± 0.001	95 ± 1	0.0054	± 0.0054	± 0.0001	< 0.009	± 0.003	0.028	± 0.001	< 0.004 ± 0.003	
15565447	07/10/03	1 of 1	0.012	± 0.001	120 ± 1	0.0021	± 0.0021	± 0.0001	< 0.009	± 0.007	0.0094	± 0.0000	0.010 ± 0.005	
15565447	07/24/03	1 of 1	0.007	± 0.002	128 ± 0	0.0010	± 0.0010	± 0.0000	< 0.009	± 0.004	0.0065	± 0.0009	0.007 ± 0.003	
15565447	08/19/03	1 of 1	0.010	± 0.000	127 ± 2	0.0021	± 0.0021	± 0.0002	< 0.009	± 0.002	0.0094	± 0.0013	< 0.004 ± 0.002	
15565447	09/23/03	1 of 1	0.023	± 0.001	123 ± 1	0.0037	± 0.0037	± 0.0001	< 0.009	± 0.006	0.025	± 0.001	< 0.004 ± 0.000	

**Table 8.** Selected dissolved major cations and trace elements from fixed-station sampling sites in the Yukon River Basin-continued

Station ID	Date	Rep	Thulium µg/L		Uranium µg/L		Vanadium µg/L		Tungsten µg/L		Yttrium µg/L		Ytterbium µg/L		Zirconium µg/L	
			A	SD	A	SD	A	SD	A	SD	A	SD	A	SD	A	SD
15356000	04/01/03	1 of 1	0.0002	± 0.0001	1.2	± 0.0	0.15	± 0.05	0.007	± 0.000	0.021	± 0.001	0.0017	± 0.0002	0.028	± 0.004
15356000	05/23/03	1 of 1	0.0022	± 0.0001	0.92	± 0.01	0.31	± 0.07	0.006	± 0.000	0.18	± 0.00	0.015	± 0.001	0.16	± 0.01
15356000	06/17/03	1 of 1	0.0005	± 0.0001	0.74	± 0.01	0.35	± 0.06	0.008	± 0.001	0.045	± 0.002	0.0034	± 0.0000	0.047	± 0.001
15356000	07/17/03	1 of 1	0.0002	± 0.0001	0.88	± 0.01	0.52	± 0.09	0.013	± 0.001	0.024	± 0.001	0.0023	± 0.0005	0.043	± 0.004
15356000	08/13/03	1 of 1	0.0003	± 0.0000	0.93	± 0.01	0.49	± 0.09	0.012	± 0.001	0.019	± 0.000	0.0019	± 0.0002	0.036	± 0.010
15356000	09/09/03	1 of 1	0.0006	± 0.0000	0.93	± 0.04	0.25	± 0.05	0.012	± 0.000	0.044	± 0.001	0.0036	± 0.0004	0.086	± 0.024
15356000	09/24/03	1 of 1	0.0004	± 0.0001	0.95	± 0.01	0.19	± 0.07	0.008	± 0.000	0.031	± 0.001	0.0027	± 0.0001	0.039	± 0.001
15389000	04/04/03	1 of 1	0.0002	± 0.0001	0.83	± 0.01	< 0.1	± 0.1	0.003	± 0.001	0.024	± 0.001	0.0014	± 0.0004	0.039	± 0.004
15389000	06/09/03	1 of 1	0.0026	± 0.0001	0.23	± 0.01	0.33	± 0.02	0.004	± 0.001	0.23	± 0.00	0.017	± 0.000	0.23	± 0.00
15389000	06/19/03	1 of 1	0.0016	± 0.0000	0.41	± 0.01	0.36	± 0.05	0.006	± 0.003	0.13	± 0.00	0.0094	± 0.0001	0.14	± 0.00
15389000	07/01/03	1 of 1	0.0010	± 0.0001	0.40	± 0.00	0.23	± 0.07	0.003	± 0.001	0.083	± 0.000	0.0060	± 0.0001	0.13	± 0.00
15389000	07/23/03	1 of 1	0.0032	± 0.0000	0.27	± 0.01	0.20	± 0.06	0.003	± 0.001	0.26	± 0.01	0.018	± 0.001	0.27	± 0.01
15389000	08/19/03	1 of 1	0.0025	± 0.0002	0.25	± 0.00	0.21	± 0.07	0.005	± 0.001	0.22	± 0.00	0.016	± 0.002	0.18	± 0.01
15389000	09/22/03	1 of 1	0.0024	± 0.0002	0.44	± 0.00	0.14	± 0.07	0.006	± 0.001	0.19	± 0.00	0.015	± 0.000	0.22	± 0.00
15453500	03/26/03	1 of 1	0.0002	± 0.0001	1.1	± 0.0	< 0.1	± 0.1	0.006	± 0.001	0.018	± 0.001	0.0013	± 0.0002	0.030	± 0.004
15453500	05/29/03	1 of 1	0.0036	± 0.0000	0.59	± 0.02	0.37	± 0.03	0.010	± 0.002	0.30	± 0.01	0.020	± 0.001	0.22	± 0.01
15453500	06/12/03	1 of 1	0.0011	± 0.0000	0.59	± 0.00	0.40	± 0.09	0.009	± 0.002	0.11	± 0.00	0.0082	± 0.0011	0.13	± 0.02
15453500	07/15/03	1 of 1	0.0006	± 0.0000	0.80	± 0.00	0.50	± 0.09	0.010	± 0.001	0.048	± 0.002	0.0039	± 0.0004	0.098	± 0.001
15453500	07/24/03	1 of 1	0.0007	± 0.0000	0.71	± 0.01	0.49	± 0.02	0.010	± 0.001	0.053	± 0.001	0.0046	± 0.0002	0.079	± 0.003
15453500	08/21/03	1 of 1	0.0006	± 0.0000	0.70	± 0.00	0.34	± 0.07	0.009	± 0.001	0.045	± 0.001	0.0046	± 0.0002	0.077	± 0.003
15453500	09/11/03	1 of 1	0.0019	± 0.0001	0.67	± 0.01	0.33	± 0.04	0.008	± 0.000	0.13	± 0.00	0.012	± 0.000	0.23	± 0.02



**Table 8.** Selected dissolved major cations and trace elements from fixed-station sampling sites in the Yukon River Basin-continued

Station ID	Date	Rep	Thulium µg/L		Uranium µg/L		Vanadium µg/L		Tungsten µg/L		Yttrium µg/L		Ytterbium µg/L		Zirconium µg/L	
			A	SD	A	SD	A	SD	A	SD	A	SD	A	SD	A	SD
15515500	03/19/03	1 of 1	0.0002	± 0.0000	0.82	± 0.01	0.13	± 0.08	0.007	± 0.001	0.021	± 0.001	0.0023	± 0.0002	0.039	± 0.006
15515500	05/08/03	1 of 1	0.0008	± 0.0001	0.79	± 0.01	0.44	± 0.15	0.010	± 0.001	0.052	± 0.003	0.0052	± 0.0005	0.061	± 0.002
15515500	05/28/03	1 of 1	0.0007	± 0.0003	0.83	± 0.03	0.63	± 0.06	0.013	± 0.001	0.048	± 0.002	0.0045	± 0.0002	0.064	± 0.010
15515500	07/22/03	1 of 1	0.0003	± 0.0001	0.91	± 0.01	0.53	± 0.13	0.015	± 0.001	0.022	± 0.001	0.0023	± 0.0001	0.021	± 0.001
15515500	08/15/03	1 of 1	0.0002	± 0.0001	1.0	± 0.0	0.28	± 0.00	0.020	± 0.000	0.015	± 0.000	0.0012	± 0.0000	0.033	± 0.003
15515500	09/12/03	1 of 1	0.0010	± 0.0000	0.77	± 0.02	0.44	± 0.03	0.011	± 0.000	0.063	± 0.002	0.0063	± 0.0002	0.064	± 0.004
15565447	03/25/03	1 of 1	0.0005	± 0.0001	0.92	± 0.02	< 0.1	± 0.1	0.003	± 0.001	0.029	± 0.000	0.0027	± 0.0002	0.054	± 0.000
15565447	05/28/03	1 of 1	0.0033	± 0.0002	0.48	± 0.02	0.62	± 0.07	0.014	± 0.001	0.28	± 0.01	0.023	± 0.001	0.22	± 0.02
15565447	06/17/03	1 of 1	0.0028	± 0.0002	0.45	± 0.00	0.55	± 0.08	0.010	± 0.001	0.21	± 0.00	0.018	± 0.001	0.20	± 0.01
15565447	07/10/03	1 of 1	0.0010	± 0.0002	0.68	± 0.01	0.60	± 0.09	0.011	± 0.001	0.072	± 0.002	0.0065	± 0.0004	0.11	± 0.01
15565447	07/24/03	1 of 1	0.0007	± 0.0001	0.76	± 0.00	0.53	± 0.10	0.012	± 0.001	0.049	± 0.001	0.0047	± 0.0001	0.077	± 0.007
15565447	08/19/03	1 of 1	0.0010	± 0.0002	0.67	± 0.00	0.54	± 0.10	0.011	± 0.001	0.076	± 0.004	0.0069	± 0.0002	0.10	± 0.00
15565447	09/23/03	1 of 1	0.0021	± 0.0001	0.66	± 0.01	0.48	± 0.11	0.009	± 0.002	0.14	± 0.00	0.013	± 0.001	0.21	± 0.00

## **CHAPTER 5 - Dissolved and Colloidal Trace Elements**

***by Alan M. Shiller***

A description of sample collection and processing of samples for colloidal and dissolved trace elements filtered through 0.45- $\mu\text{m}$  and 0.02- $\mu\text{m}$  pore size respectively, 25-mm-diameter filters is given in Schuster (2003). For operational definitions in this report, the 0.45- $\mu\text{m}$  filtered samples include dissolved and colloidal material whereas the 0.02- $\mu\text{m}$  filtered samples include dissolved material only. The colloidal fraction of the sample can be determined by subtracting the 0.02- $\mu\text{m}$  fraction from the 0.45- $\mu\text{m}$  fraction. Sample analysis results for WY 2003 are given in tables 9 and 10.

**Table 9.** Dissolved trace elements in 0.02- $\mu\text{m}$  filtered samples from five fixed-station sampling sites in the Yukon River Basin

[Station ID, refer to table 1 for description and figure 1 for location; data are in micrograms per liter; Ba, barium; Cd, cadmium; Ce, cerium; Co, cobalt; Cr, chromium; Cs, cesium; Cu, copper; Fe, iron; Li, lithium; Mn, manganese; Mo, molybdenum; Ni, nickel; Pb, lead; Rb, rubidium; Re, rhenium; Sr, strontium; Tl, thallium; U, uranium; V, vanadium; Zn, zinc; --, no data; <, less than]

Station ID	Date	Ba	Cd	Ce	Co	Cr	Cs	Cu	Fe	Li	Mn
15356000	4/1/03	55	0.009	0.001	0.007	0.08	0.003	0.38	0.4	2.64	1.7
15356000	5/23/03	42	0.013	0.067	0.050	0.10	0.004	1.86	30.2	2.54	7.2
15356000	6/17/03	--	0.011	0.008	0.020	0.06	--	1.12	1.3	2.74	1.6
15356000	7/17/03	--	0.001	0.004	0.017	0.09	--	1.13	0.8	3.45	0.5
15356000	8/13/03	--	0.002	0.002	0.021	0.09	--	0.87	0.5	3.27	1.4
15356000	9/9/03	44	0.002	0.007	0.019	0.08	0.005	0.82	2.0	3.22	1.6
15356000	9/24/03	44	0.009	0.003	0.020	0.07	0.003	0.57	0.7	2.83	3.8
15565447	3/25/03	76	0.011	0.004	0.110	0.04	0.003	0.55	2.9	3.30	96.3
15565447	5/28/03	--	0.009	0.073	0.057	--	--	3.32	44.9	1.95	7.5
15565447	6/17/03	37	0.006	0.067	0.054	0.12	0.003	3.26	37.9	2.15	11.4
15565447	7/10/03	42	0.003	0.008	0.020	0.10	0.004	1.74	3.9	2.61	2.8
15565447	7/24/03	--	--	--	--	--	--	--	--	--	--
15565447	8/19/03	41	0.003	0.011	0.025	0.12	0.005	1.96	5.1	3.23	2.7
15565447	9/23/03	38	0.004	0.032	0.039	0.16	0.002	2.20	25.0	2.83	6.2
15389000	4/4/03	95	0.005	0.001	0.023	0.03	0.008	0.25	1.2	7.87	14.6
15389000	6/9/03	34	0.003	0.047	0.046	0.11	0.001	1.47	42.6	2.47	1.7
15389000	6/19/03	--	0.003	0.012	0.032	0.09	--	1.26	10.6	3.54	1.2
15389000	7/1/03	--	0.002	0.006	0.026	0.09	--	1.28	5.6	5.01	0.7
15389000	7/23/03	--	0.002	0.028	0.047	0.17	--	1.74	24.1	4.63	1.8
15389000	8/19/03	--	0.006	0.034	0.053	0.14	--	1.20	20.8	4.20	2.5
15389000	9/22/03	48	0.006	0.023	0.088	0.13	0.001	0.99	19.8	4.70	5.2
15453500	3/26/03	68	0.005	0.002	0.009	0.06	0.002	0.45	1.0	3.47	5.7
15453500	5/29/03	39	0.008	0.092	0.058	0.11	0.002	2.25	66.8	2.80	5.9
15453500	6/12/03	39	0.005	0.028	0.036	0.08	0.003	1.79	12.1	2.66	3.3
15453500	7/15/03	--	0.004	0.009	0.019	0.09	--	1.73	2.5	3.40	0.8
15453500	7/24/03	--	0.002	0.008	0.022	0.11	--	1.80	3.0	4.13	0.8
15453500	8/21/03	--	<0.001	0.007	0.022	0.10	--	1.25	3.1	3.80	1.0
15453500	9/11/03	40	0.004	0.031	0.034	0.13	0.003	1.43	16.5	3.55	2.7
15515500	3/19/03	52	0.009	0.003	0.140	0.03	0.008	0.41	12.3	3.24	98.2
15515500	5/8/03	38	0.006	0.008	0.106	0.15	0.011	1.54	3.3	2.79	39.6
15515500	5/28/03	38	0.004	0.005	0.051	0.21	0.011	1.50	1.8	4.07	18.8
15515500	6/11/03	38	0.001	0.005	0.052	0.19	0.015	1.52	1.7	5.52	12.8
15515500	7/22/03	--	0.008	0.004	0.050	0.10	--	0.97	0.8	5.03	7.1
15515500	8/15/03	37	0.003	0.001	0.020	0.10	0.028	0.46	<0.4	5.36	1.2
15515500	9/12/03	33	0.010	0.014	0.085	0.17	0.008	1.14	5.3	3.73	23.9

**Table 9.** Dissolved trace elements in 0.02- $\mu\text{m}$  filtered samples from five fixed-station sampling sites in the Yukon River Basin-continued

Station ID	Date	Mo	Ni	Pb	Rb	Re	Sr	Tl	U	V	Zn
15356000	4/1/03	1.30	0.70	0.002	0.79	0.003	140	0.002	1.11	0.28	0.07
15356000	5/23/03	0.89	2.04	0.006	0.79	0.003	124	0.004	0.89	0.27	0.21
15356000	6/17/03	0.97	1.34	0.001	--	0.003	119	--	0.68	0.28	--
15356000	7/17/03	1.46	0.82	0.001	--	0.003	131	--	0.85	0.44	--
15356000	8/13/03	1.51	0.69	<0.001	--	0.003	143	--	0.81	0.44	--
15356000	9/9/03	1.17	1.08	0.001	1.02	0.003	149	0.004	0.91	0.27	0.16
15356000	9/24/03	1.20	1.20	0.002	0.79	0.003	146	0.002	0.90	0.23	0.15
15565447	3/25/03	0.83	0.93	0.002	1.30	0.002	165	0.003	0.90	0.05	0.21
15565447	5/28/03	0.48	1.60	0.066	--	0.002	79	--	0.28	0.39	--
15565447	6/17/03	0.56	1.50	0.022	0.95	0.002	86	0.004	0.40	0.45	0.13
15565447	7/10/03	0.88	0.78	0.004	1.17	0.003	107	0.004	0.67	0.45	0.06
15565447	7/24/03	--	--	--	--	--	--	--	--	--	--
15565447	8/19/03	0.90	0.76	0.004	1.43	0.003	117	0.004	0.58	0.46	0.51
15565447	9/23/03	0.64	1.17	0.009	0.83	0.002	112	0.002	0.59	0.33	0.25
15389000	4/4/03	0.69	0.77	0.001	0.35	0.003	138	0.003	0.88	0.20	0.18
15389000	6/9/03	0.26	1.95	0.018	0.25	0.001	53	0.003	0.15	0.22	0.10
15389000	6/19/03	0.43	1.62	0.004	--	0.002	77	--	0.39	0.17	--
15389000	7/1/03	0.48	1.58	0.003	--	0.002	95	--	0.36	0.19	--
15389000	7/23/03	0.33	2.50	0.003	--	0.002	83	--	0.23	0.18	--
15389000	8/19/03	0.30	1.96	0.006	--	0.002	86	--	0.26	0.14	--
15389000	9/22/03	0.42	2.43	0.004	0.16	0.002	100	0.002	0.45	0.15	0.20
15453500	3/26/03	1.21	0.70	0.002	0.86	0.003	155	0.003	1.18	0.24	0.04
15453500	5/29/03	0.54	2.32	0.013	0.65	0.002	91	0.004	0.51	0.27	0.13
15453500	6/12/03	0.58	1.38	0.005	0.66	0.002	92	0.004	0.54	0.34	0.10
15453500	7/15/03	1.13	0.98	0.004	--	0.003	119	--	0.84	0.48	--
15453500	7/24/03	1.17	1.08	0.001	--	0.003	119	--	0.73	0.42	--
15453500	8/21/03	1.05	0.92	0.005	--	0.003	116	--	0.70	0.34	--
15453500	9/11/03	0.84	1.45	0.004	0.75	0.002	118	0.003	0.63	0.34	0.12
15515500	3/19/03	1.27	0.68	0.001	1.26	0.003	181	0.003	0.76	0.16	0.09
15515500	5/8/03	0.88	1.06	0.002	1.57	0.003	140	0.005	0.74	0.45	0.05
15515500	5/28/03	1.09	0.78	0.001	1.56	0.003	161	0.005	0.76	0.49	0.50
15515500	6/11/03	1.18	0.82	0.002	2.04	0.004	149	0.007	0.96	0.55	<0.04
15515500	7/22/03	1.28	0.75	0.002	--	0.004	122	--	0.88	0.52	--
15515500	8/15/03	1.35	0.77	<0.001	3.97	0.004	130	0.012	1.06	0.32	<0.04
15515500	9/12/03	0.95	1.07	0.002	1.58	0.003	141	0.005	0.71	0.48	0.09

**Table 10.** Dissolved and colloidal trace elements in 0.45- $\mu$ m filtered samples from five fixed-station sampling sites in the Yukon River Basin

[Station ID, refer to table 1 for description and figure 1 for location; data are in micrograms per liter; Ba, barium; Cd, cadmium; Ce, cerium; Co, cobalt; Cr, chromium; Cs, cesium; Cu, copper; Fe, iron; Li, lithium; Mn, manganese; Mo, molybdenum; Ni, nickel; Pb, lead; Rb, rubidium; Re, rhenium; Sr, strontium; Tl, thallium; U, uranium; V, vanadium; Zn, zinc; <, less than]

Station ID	Date	Ba	Cd	Ce	Co	Cr	Cs	Cu	Fe	Li	Mn
15356000	4/1/03	56	0.013	0.004	0.007	0.08	0.003	0.45	1.9	2.65	1.8
15356000	5/23/03	45	0.034	0.150	0.062	0.13	0.005	2.13	92.2	2.53	8.7
15356000	6/17/03	47	0.027	0.111	0.068	0.16	0.010	1.34	97.3	2.78	4.9
15356000	7/17/03	44	0.008	0.273	0.168	0.47	0.029	1.62	285.6	3.61	5.8
15356000	8/13/03	45	0.009	0.222	0.147	0.28	0.022	1.29	229.2	3.42	6.0
15356000	9/9/03	45	0.013	0.026	0.028	0.10	0.006	0.90	14.6	3.37	2.1
15356000	9/24/03	46	0.018	0.014	0.021	0.08	0.003	0.62	7.8	2.74	3.9
15565447	3/25/03	78	0.015	0.015	0.115	0.07	0.004	0.61	150.9	3.46	101.7
15565447	5/28/03	36	0.045	0.283	0.088	0.17	0.004	3.78	325.5	1.92	14.5
15565447	6/17/03	40	0.014	0.248	0.090	0.18	0.005	3.85	229.3	2.21	16.3
15565447	7/10/03	46	0.011	0.137	0.058	0.20	0.007	2.20	181.5	2.82	5.6
15565447	7/24/03	49	0.008	0.245	0.134	0.40	0.017	2.38	265.8	3.32	7.7
15565447	8/19/03	46	0.008	0.190	0.084	0.27	0.010	2.42	203.0	3.29	6.7
15565447	9/23/03	41	0.010	0.168	0.067	0.24	0.005	2.47	280.1	2.76	9.3
15389000	4/4/03	91	0.005	0.002	0.023	0.03	0.008	0.25	4.1	7.60	14.1
15389000	6/9/03	37	0.010	0.145	0.061	0.16	0.003	1.67	201.3	2.59	3.0
15389000	6/19/03	49	0.007	0.054	0.039	0.12	0.002	1.42	124.3	3.61	1.7
15389000	7/1/03	61	0.004	0.023	0.028	0.10	0.003	1.30	48.4	4.98	0.9
15389000	7/23/03	51	0.013	0.117	0.066	0.24	0.003	1.89	228.1	4.29	3.2
15389000	8/19/03	46	0.013	0.107	0.072	0.18	0.002	1.36	156.3	4.33	3.8
15389000	9/22/03	54	0.015	0.069	0.109	0.18	0.001	1.19	141.0	4.72	6.3
15453500	3/26/03	67	0.007	0.005	0.010	0.06	0.002	0.46	8.8	3.41	5.7
15453500	5/29/03	42	0.017	0.204	0.076	0.16	0.004	2.44	173.3	2.72	7.2
15453500	6/12/03	39	0.011	0.101	0.051	0.11	0.004	1.85	90.0	2.53	4.9
15453500	7/15/03	47	0.015	0.214	0.100	0.29	0.014	1.93	176.0	3.11	4.5
15453500	7/24/03	50	0.010	0.229	0.141	0.39	0.024	2.26	251.2	4.21	4.9
15453500	8/21/03	45	0.008	0.180	0.104	0.29	0.016	1.51	188.9	3.91	4.2
15453500	9/11/03	42	0.011	0.090	0.047	0.18	0.004	1.53	82.9	3.52	4.0
15515500	3/19/03	51	0.010	0.006	0.137	0.04	0.008	0.45	28.5	3.19	94.0
15515500	5/8/03	40	0.015	0.098	0.135	0.21	0.012	1.89	128.3	2.83	41.0
15515500	5/28/03	39	0.010	0.039	0.064	0.23	0.011	1.71	86.1	4.14	19.3
15515500	6/11/03	40	0.011	0.062	0.083	0.25	0.017	1.76	72.0	5.59	15.5
15515500	7/22/03	35	0.009	0.045	0.064	0.15	0.021	1.10	44.1	4.97	7.2
15515500	8/15/03	37	0.009	0.053	0.068	0.25	0.034	0.69	108.8	5.45	2.8
15515500	9/12/03	36	0.017	0.129	0.136	0.27	0.012	1.47	178.4	3.75	26.5

**Table 10.** Dissolved and colloidal trace elements in 0.45- $\mu\text{m}$  filtered samples from five fixed-station sampling sites in the Yukon River Basin-continued

Station ID	Date	Mo	Ni	Pb	Rb	Re	Sr	Tl	U	V	Zn
15356000	4/1/03	1.27	0.68	0.007	0.81	0.003	140	0.002	1.16	0.23	1.26
15356000	5/23/03	0.81	2.16	0.060	0.80	0.003	123	0.004	0.87	0.34	1.11
15356000	6/17/03	0.85	1.52	0.081	0.98	0.003	119	0.006	0.72	0.45	1.34
15356000	7/17/03	1.25	1.25	0.103	2.23	0.003	129	0.009	0.89	1.00	1.00
15356000	8/13/03	1.36	1.08	0.080	1.82	0.003	146	0.008	0.90	0.86	0.96
15356000	9/9/03	1.18	1.09	0.008	1.01	0.003	148	0.004	0.89	0.31	0.36
15356000	9/24/03	1.21	1.26	0.005	0.77	0.003	141	0.003	1.00	0.19	0.58
15565447	3/25/03	0.88	0.91	0.010	1.37	0.002	171	0.003	0.89	0.09	0.27
15565447	5/28/03	0.42	1.84	0.270	0.83	0.002	80	0.003	0.43	0.67	0.76
15565447	6/17/03	0.52	1.78	0.277	0.98	0.002	91	0.004	0.43	0.77	0.66
15565447	7/10/03	0.89	0.88	0.126	1.28	0.003	113	0.004	0.65	0.71	0.33
15565447	7/24/03	0.87	1.02	0.187	1.49	0.003	117	0.005	0.74	0.97	0.85
15565447	8/19/03	0.93	1.02	0.148	1.47	0.003	118	0.005	0.65	0.78	0.56
15565447	9/23/03	0.67	1.28	0.159	0.86	0.002	115	0.003	0.63	0.58	0.34
15389000	4/4/03	0.66	0.74	<0.001	0.34	0.003	135	0.003	0.82	0.15	0.71
15389000	6/9/03	0.21	2.20	0.139	0.26	0.001	52	0.003	0.19	0.36	0.71
15389000	6/19/03	0.42	1.88	0.080	0.25	0.002	77	0.003	0.34	0.28	0.52
15389000	7/1/03	0.48	1.62	0.028	0.34	0.002	92	0.004	0.38	0.24	0.23
15389000	7/23/03	0.28	2.78	0.108	0.26	0.002	82	0.004	0.26	0.32	1.32
15389000	8/19/03	0.27	2.34	0.100	0.22	0.002	90	0.003	0.27	0.24	0.90
15389000	9/22/03	0.44	2.81	0.041	0.17	0.002	108	0.002	0.49	0.21	1.50
15453500	3/26/03	1.17	0.68	0.003	0.84	0.003	148	0.003	1.10	0.20	0.32
15453500	5/29/03	0.48	2.48	0.090	0.65	0.002	88	0.004	0.55	0.39	0.67
15453500	6/12/03	0.49	1.38	0.098	0.62	0.002	85	0.004	0.55	0.42	0.50
15453500	7/15/03	0.88	1.19	0.087	1.46	0.003	115	0.006	0.81	0.75	0.90
15453500	7/24/03	0.98	1.44	0.095	1.89	0.003	117	0.008	0.73	0.89	0.99
15453500	8/21/03	0.89	1.14	0.082	1.30	0.003	120	0.006	0.72	0.67	0.52
15453500	9/11/03	0.69	1.57	0.038	0.74	0.002	113	0.003	0.62	0.39	0.42
15515500	3/19/03	1.18	0.65	0.003	1.21	0.003	173	0.003	0.78	0.17	0.27
15515500	5/8/03	1.04	1.20	0.120	1.58	0.003	142	0.005	0.79	0.66	0.29
15515500	5/28/03	1.11	0.82	0.049	1.53	0.004	153	0.005	0.81	0.57	0.60
15515500	6/11/03	1.11	0.92	0.078	2.00	0.004	144	0.007	0.89	0.70	0.39
15515500	7/22/03	1.24	0.89	0.028	2.74	0.004	120	0.009	0.93	0.60	0.20
15515500	8/15/03	1.26	0.98	0.063	3.81	0.004	122	0.012	0.99	0.53	0.46
15515500	9/12/03	0.89	1.29	0.099	1.58	0.003	141	0.006	0.70	0.75	0.53

## **CHAPTER 6 - Mercury Analyses**

***by John F. DeWild and Mark L. Olson***

A description of sample collection and processing of samples for filtered (dissolved), methyl, particulate, and total mercury (Hg) is given in Schuster (2003). Sample analysis results for WY 2003 are given in table 11.

**Table 11.** Mercury and methylmercury concentrations from fixed-station sampling sites in the Yukon River Basin

[Station ID, refer to table 1 for description and figure 1 for location; Hg, mercury; ng/L, nanogram per liter; QA flag, Quality Assurance flag; FMHg, Filtered Methylmercury; FTHg, Filtered Total mercury; PMHg, Particulate Methylmercury; PTHg, Particulate Total mercury; UMHg, Unfiltered Methylmercury; UTHg, Unfiltered Total mercury; S2, Percent recovery of either the matrix spike or matrix spike duplicate exceed the data quality objectives (value is less than 75% or greater than 125%) but the difference between the pair is less than 25%; E, Estimated; Q, Quality Control failed; S1, Percent recovery for matrix spike and matrix spike duplicate pair meet data quality objectives (both values fall between 75% and 125%) but the values of the pair differ by more than 25%; --, no data collected; <, less than]

Station ID	Date/Time	Methyl Hg QA flag	Total Hg QA flag	Filtered Methyl-Hg (FMHg) (ng/L)	Filtered Total-Hg (FTHg) (ng/L)	Particulate Methyl-Hg (PMHg) (ng/L)	Particulate Total-Hg (PTHg) (ng/L)	Unfiltered Methyl-Hg (UMHg) (ng/L)	Unfiltered Total-Hg (UTHg) (ng/L)
15389000	4/4/03 15:30			< 0.04	0.72	< 0.010	< 0.06	--	--
15389000	6/9/03 15:10			< 0.04	2.39	0.032	6.90	--	--
15389000	6/19/03 14:20	S2		< 0.04	1.47	< 0.037	1.20	--	--
15389000	7/1/03 14:30	S2		< 0.04	1.38	< 0.019	0.61	--	--
15389000	7/23/03 15:40			--	--	--	--	--	6.36
15389000	8/19/03 1310			0.04E	45.1	< 0.041	3.61	--	--
15389000	9/22/03 13:00			< 0.04	1.53	< 0.015	0.63	--	--
15515500	3/19/03 18:30			--	1.01	< 0.012	2.18	--	--
15515500	5/8/03 14:40			--	1.43	0.047	21.64	--	--
15515500	5/28/03 15:30			--	0.91	< 0.023	4.75	--	--
15515500	6/11/03 13:30		Q	--	0.96	< 0.047	14.96	--	--
15515500	7/22/03 13:30			--	--	--	--	--	43.8
15515500	8/15/03 11:30			< 0.04	0.56	0.102	63.31	--	--
15515500	9/12/03 13:40			< 0.04	1.15	< 0.032	9.22	--	--
15356000	4/1/03 10:50			< 0.04	0.32	< 0.010	0.19	--	--
15356000	5/23/03 17:40			0.04	3.06	< 0.022	5.04	--	--
15356000	6/17/03 12:20			0.05	1.91	< 0.076	17.47	--	--
15356000	7/17/03 13:00			< 0.04	1.05	< 0.046	30.02	--	--
15356000	8/13/03 13:00			< 0.04	0.53	< 0.041	14.61	--	--
15356000	9/9/03 14:30	S2		< 0.04	0.61	< 0.018	4.42	--	--
15356000	9/24/03 12:30			< 0.04	1.03	< 0.010	1.35	--	--
15565447	3/25/03 19:00			< 0.04	0.28	< 0.011	0.37	--	--
15565447	5/28/03 14:40			0.05	2.73	< 0.060	20.75	--	--
15565447	6/17/03 17:20		Q	0.04	1.86	0.049	16.67	--	--
15565447	7/10/03 18:20			--	--	--	--	--	15.6
15565447	7/24/03 19:50	S1		--	--	--	--	0.06	25.7
15565447	8/19/03 17:10			< 0.04	1.36	< 0.057	21.07	--	--
15565447	9/23/03 18:00			< 0.04	1.99	< 0.040	6.67	--	--
15453500	3/26/03 19:00			0.06	0.36	.0128	0.77	--	--
15453500	5/29/03 16:00	S2		0.04	3.87	.0263	4.72	--	--
15453500	6/12/03 14:20			0.06	2.40	--	13.66	--	--
15453500	7/15/03 16:00			--	--	--	--	--	--
15453500	7/24/03 14:10	S1		0.04	1.54	.0601	20.79	--	--
15453500	8/21/03 13:30			0.04	1.46	.0915	11.64	--	--
15453500	9/11/03 16:10			0.04	1.78	.0243	3.22	--	--



## **CHAPTER 7 - Dissolved Gasses and Dissolved Inorganic Carbon**

***by Robert G. Striegl and Mark M. Dornblaser***

A description of sample collection and processing of samples for the partial pressures of carbon dioxide ( $P_{\text{CO}_2}$ ) and methane ( $P_{\text{CH}_4}$ ) is given in Schuster (2003). Sample analysis results for WY 2003 are given in table 12.

**Table 12.** Carbon dioxide, methane, and dissolved inorganic carbon concentrations from fixed-station sampling sites in the Yukon River Basin

[Station ID, refer to table 1 for description and figure 1 for location; CO<sub>2</sub>, carbon dioxide; µmol/L, micromole per liter; P<sub>CO2</sub>, partial pressure of CO<sub>2</sub>; µatmos, microatmospheres; CH<sub>4</sub>, methane; P<sub>CH4</sub>, partial pressure of CH<sub>4</sub>; DIC, dissolved inorganic carbon]

Station ID	Date	CO <sub>2</sub> (µmol/L)	Corrected P <sub>CO2</sub> (µatmos)	CH <sub>4</sub> (µmol/L)	Corrected P <sub>CH4</sub> (µatmos)	DIC (µmol/L)
15356000	3/31/2003	154.0	1,916	0.17	3.6	2,584
15356000	5/23/2003	60.9	1,054	0.15	3.4	1,657
15356000	6/17/2003	51.9	1,058	0.16	3.6	1,600
15356000	7/17/2003	72.3	1,615	0.15	3.3	1,723
15356000	8/13/2003	52.9	1,139	0.15	3.5	1,803
15356000	9/9/2003	70.1	1,281	0.18	4.1	1,938
15356000	9/24/2003	58.3	813	0.16	3.3	2,030
15389000	4/4/2003	290.3	3,657	0.10	2.1	4,220
15389000	6/9/2003	76.6	1,505	0.21	4.7	1,113
15389000	6/19/2003	60.1	1,334	0.18	4.1	1,584
15389000	7/1/2003	87.2	2,158	0.14	3.3	1,749
15389000	7/23/2003	79.0	1,760	0.18	4.2	1,288
15389000	8/19/2003	64.7	1,246	0.24	5.3	1,246
15389000	9/22/2003	84.4	1,123	0.19	4.0	1,999
15453500	3/26/2003	185.2	2,356	0.29	6.2	2,865
15453500	5/29/2003	87.5	1,585	0.27	6.0	1,518
15453500	6/4/2003	50.0	974	0.13	2.9	1,427
15453500	6/12/2003	69.3	1,491	0.31	7.1	1,536
15453500	7/15/2003	51.7	1,188	0.24	5.6	1,811
15453500	7/24/2003	73.1	1,743	0.16	3.8	1,652
15453500	8/8/2003	37.9	796	0.18	4.0	1,646
15453500	8/21/2003	56.3	1,195	0.25	5.6	1,772
15453500	8/24/2003	45.4	917	0.16	3.7	1,802
15453500	9/11/2003	72.3	1,278	0.23	5.1	1,709
15515500	3/19/2003	300.4	3,809	3.54	74.9	3,433
15515500	5/8/2003	97.4	1,543	2.06	45.1	2,163
15515500	5/28/2003	87.2	1,736	1.30	29.3	2,426
15515500	6/11/2003	81.6	1,869	0.71	16.2	2,156
15515500	7/22/2003	79.8	1,822	0.34	7.8	1,538
15515500	8/15/2003	69.8	1,436	0.53	12.0	1,641
15515500	9/12/2003	79.7	1,328	1.63	35.7	1,932
15565447	3/25/2003	603.4	7,740	0.49	10.3	3,972
15565447	5/28/2003	119.6	2,036	0.20	4.4	1,407
15565447	6/13/2003	65.4	1,378	0.26	5.8	1,475
15565447	6/17/2003	48.5	1,062	0.26	5.9	1,504
15565447	7/10/2003	82.6	1,955	0.27	6.1	1,787
15565447	7/24/2003	89.3	2,019	0.21	4.7	1,703
15565447	8/19/2003	49.4	1,065	0.28	6.4	1,744
15565447	9/23/2003	85.9	1,412	0.33	7.3	1,786

## **CHAPTER 8 - Sediment Chemistry**

***by* Arthur J. Horowitz**

A description of sample collection and processing of samples for suspended sediment chemistry is given in Schuster (2003). Sample analysis results for WY 2003 are given in table 13.

**Table 13.** Sediment chemistry data from fixed-station sampling sites in the Yukon River Basin

[Station ID, refer to table 1 for description and figure 1 for location; mg/L, milligram per liter; µg/g, microgram per gram; %, percent; Sets A & B indicate duplicate samples; <, less than; NR/IS, No Result/Insufficient Sample]

Station ID	Date/Time	Suspended Sediment (mg/L)	Silver (µg/g)	Copper (µg/g)	Lead (µg/g)	Zinc (µg/g)	Cadmium (µg/g)
15356000	5/23/2003 17:40	7	1.0	37	19	180	1.3
15356000	6/17/2003 12:20	288	0.7	40	14	200	1.2
15356000	7/17/2003 13:00	959	0.5	44	10	110	0.6
15356000 (Set A)	7/17/2003 13:10	931	0.6	44	9	99	0.6
15356000 (Set B)	8/13/2003 13:00	395	<0.5	43	11	94	0.4
15356000	9/9/2003 14:30	161	<0.5	31	14	110	0.8
15356000	9/24/2003 12:30	37	<0.5	30	14	120	0.6
15389000	6/9/2003 15:10	91	<0.5	28	21	200	0.8
15389000	6/19/2003 14:25	10	<0.5	24	35	150	1.4
15389000	7/1/2003 14:30	7	<0.5	40	38	190	2.2
15389000	7/23/2003 15:40	41	<0.5	34	24	260	0.8
15389000	8/19/2003 13:10	53	<0.5	31	24	220	1.0
15389000	9/22/2003 13:00	11	<0.5	25	12	170	0.9
15453500	3/26/2003 19:00	7	6	0.7	49	18	280
15453500 (Set A)	5/29/2003 16:00	386	9	<0.5	34	18	160
15453500 (Set B)	5/29/2003 16:10	239	46	<0.5	29	16	130
15453500	6/12/2003 14:20	375	356	0.6	32	13	150
15453500	7/15/2003 16:10	408	299	<0.5	45	10	120
15453500	7/24/2003 14:10	438	468	0.5	46	11	120
15453500	8/21/2003 13:30	455	267	<0.5	41	13	120
15453500	9/11/2003 16:10	229	114	<0.5	28	15	110
15515500	3/19/2003 18:30	24	<0.5	53	17	180	1.0
15515500	5/8/2003 14:40	870	<0.5	45	14	89	0.6
15515500	5/28/2003 15:30	13	<0.5	24	13	72	0.4
15515500	6/11/2003 13:30	545	<0.5	46	16	130	0.4
15515500	7/22/2003 13:30	2,597	<0.5	51	14	100	0.4
15515500 (Set A)	8/15/2003 11:30	3,790	<0.5	55	20	120	0.6
15515500 (Set B)	8/15/2003 11:40	3,734	<0.5	54	19	120	0.6
15515500	9/12/2003 13:40	654	<0.5	30	13	75	0.2

**Table 13.** Sediment chemistry data from fixed-station sampling sites in the Yukon River Basin-continued

Station ID	Date/Time	Suspended Sediment (mg/L)	Silver (µg/g)	Copper (µg/g)	Lead (µg/g)	Zinc (µg/g)	Cadmium (µg/g)
15565447	5/28/2003 14:40	24	<0.5	35	15	130	0.8
15565447	6/17/2003 17:20	405	<0.5	30	18	120	0.9
15565447	7/10/2003 18:20	222	<0.5	51	14	140	0.8
15565447	7/24/2003 19:50	372	<0.5	55	16	150	0.6
15565447 (Set A)	8/19/2003 17:10	268	<0.5	49	16	130	0.5
15565447 (Set B)	8/19/2006 17:20	262	<0.5	46	17	130	0.5
15565447	9/23/2003 18:00	153	<0.5	36	7	110	0.4

**Table 13.** Sediment chemistry data from fixed-station sampling sites in the Yukon River Basin-continued

Station ID	Date/Time	Chromium (µg/g)	Cobalt (µg/g)	Nickel (µg/g)	Barium (µg/g)	Vanadium (µg/g)	Lithium (µg/g)	Beryllium (µg/g)	Molybdenum (µg/g)
15356000	5/23/2003 17:40	100	16	61	1,100	130	28	1.5	4
15356000	6/17/2003 12:20	100	14	58	1,200	150	29	1.9	4
15356000 (Set A)	7/17/2003 13:00	92	18	55	710	140	23	1.4	2
15356000 (Set B)	7/17/2003 13:10	90	18	53	700	130	26	1.3	2
15356000	8/13/2003 13:00	99	18	55	700	130	25	1.2	2
15356000	9/9/2003 14:30	110	15	55	850	130	22	1.2	4
15356000	9/24/2003 12:30	79	12	50	300	79	19	1.0	5
15389000	6/9/2003 15:10	120	15	60	840	190	58	2.4	120
15389000	6/19/2003 14:25	110	9	58	450	85	19	1.5	110
15389000	7/1/2003 14:30	170	14	90	800	150	41	2.1	170
15389000	7/23/2003 15:40	130	18	85	1,300	230	74	2.5	130
15389000	8/19/2003 13:10	130	17	70	1,000	210	67	2	130
15389000	9/22/2003 13:00	99	15	67	240	110	44	1.3	99
15453500	3/26/2003 19:00	120	19	76	940	130	31	1.5	3
15453500 (Set A)	5/29/2003 16:00	110	15	59	970	140	32	1.6	5
15453500 (Set B)	5/29/2003 16:10	96	13	49	910	120	28	1.5	4
15453500	6/12/2003 14:20	110	14	54	920	130	30	1.8	3
15453500	7/15/2003 16:10	93	18	59	790	140	29	1.4	2
15453500	7/24/2003 14:10	95	18	61	770	140	31	1.4	3
15453500	8/21/2003 13:30	110	19	60	710	140	31	1.3	3
15453500	9/11/2003 16:10	110	15	54	830	120	26	1.2	3
15515500	3/14/2003 18:30	100	22	60	890	120	23	1.5	2
15515500	5/8/2003 14:40	83	17	45	790	120	23	1.4	2
15515500	5/28/2003 15:30	70	12	33	640	86	17	1.1	2
15515500	6/11/2003 13:30	110	16	51	830	140	26	1.9	2
15515500	7/22/2003 13:30	92	18	44	960	130	24	1.4	1
15515500 (Set A)	8/15/2003 11:30	130	20	59	1,100	150	35	1.7	2
15515500 (Set B)	8/15/2003 11:40	130	20	58	1,100	150	34	1.6	2
15515500	9/12/2003 13:40	84	14	40	700	110	19	1.1	2

**Table 13.** Sediment chemistry data from fixed-station sampling sites in the Yukon River Basin-continued

Station ID	Date/Time	Chromium (µg/g)	Cobalt (µg/g)	Nickel (µg/g)	Barium (µg/g)	Vanadium (µg/g)	Lithium (µg/g)	Beryllium (µg/g)	Molybdenum (µg/g)
15565447	5/28/2003 14:40	110	15	50	920	130	31	1.6	2
15565447	6/17/2003 17:20	83	13	40	710	110	29	1.6	1
15565447	7/10/2003 18:20	110	20	64	1,100	160	37	1.8	2
15565447	7/24/2003 19:50	110	20	57	1,100	150	34	1.6	2
15565447 (Set A)	8/19/2003 17:10	110	19	59	880	140	32	1.4	3
15565447 (Set B)	8/19/2003 17:20	110	19	60	890	140	32	1.4	3
15565447	9/23/2003 18:00	93	16	49	190	120	30	1.4	3

**Table 13.** Sediment chemistry data from fixed-station sampling sites in the Yukon River Basin-continued

Station ID	Date/Time	Phosphorus (µg/g)	Strontium (µg/g)	Arsenic (µg/g)	Antimony (µg/g)	Selenium (µg/g)	Mercury (µg/g)	Thallium (µg/g)	Uranium (µg/g)
15356000	5/23/2003 17:40	990	290	14	1.6	0.9	0.08	<50	<50
15356000	6/17/2003 12:20	1,000	260	17	2.2	0.9	0.16	<50	<50
15356000 (Set A)	7/17/2003 13:00	1,100	370	12	1.4	0.4	0.04	<50	<50
15356000 (Set B)	7/17/2003 13:10	980	360	12	1.6	0.4	0.04	<50	<50
15356000	8/13/2003 13:00	960	330	11	1.6	0.4	0.06	<50	<50
15356000	9/9/2003 14:30	860	320	11	1.6	0.5	0.02	<50	<50
15356000	9/24/2003 12:30	610	440	9.4	1.3	0.9	<0.01	<50	<50
15389000	6/9/2003 15:10	1,000	130	16	1.3	1.0	0.07	<50	<50
15389000	6/19/2003 14:25	580	85	17	1.8	1.2	0.21	<50	<50
15389000	7/1/2003 14:30	1,100	170	16	1.6	1.4	NR/IS	<50	<50
15389000	7/23/2003 15:40	1,000	140	18	1.3	1.3	0.08	<50	<50
15389000	8/19/2003 13:10	1,000	130	16	1.1	1.0	0.03	<50	<50
15389000	9/22/2003 13:00	690	310	13	1.0	1.3	<0.01	<50	<50
15453500	3/26/2003 19:00	1,000	280	16	1.2	0.8	0.25	<50	<50
15453500 (Set A)	5/29/2003 16:00	960	250	11	1.2	0.8	0.08	<50	<50
15453500 (Set B)	5/29/2003 16:10	900	260	9.5	1.1	0.6	0.09	<50	<50
15453500	6/12/2003 14:20	980	260	13	1.6	0.7	0.09	<50	<50
15453500	7/15/2003 16:10	1,000	310	14	1.5	0.4	0.03	<50	<50
15453500	7/24/2003 14:10	930	300	14	1.8	0.4	0.03	<50	<50
15453500	8/21/2003 13:30	920	280	13	1.6	0.5	0.03	<50	<50
15453500	9/11/2003 16:10	850	280	11	1.5	0.5	0.14	<50	<50
15515500	3/14/2003 18:30	990	220	39	1.2	0.5	0.09	<50	<50
15515500	5/8/2003 14:40	790	250	15	1.3	0.4	0.09	<50	<50
15515500	5/28/2003 15:30	580	220	8.5	0.8	0.1	0.02	<50	<50
15515500	6/11/2003 13:30	780	250	18	1.6	0.4	0.06	<50	<50
15515500	7/22/2003 13:30	770	230	15	1.4	0.3	0.03	<50	<50
15515500 (Set A)	8/15/2003 11:30	700	220	19	2.0	0.6	0.07	<50	<50
15515500 (Set B)	8/15/2003 11:40	690	210	19	4.9	0.5	0.06	<50	<50
15515500	9/12/2003 13:40	650	220	11	1.6	0.3	0.08	<50	<50



**Table 13.** Sediment chemistry data from fixed-station sampling sites in the Yukon River Basin-continued

Station ID	Date/Time	Phosphorus (µg/g)	Strontium (µg/g)	Arsenic (µg/g)	Antimony (µg/g)	Selenium (µg/g)	Mercury (µg/g)	Thallium (µg/g)	Uranium (µg/g)
15565447	5/28/2003 14:40	950	220	12	1.1	0.4	0.06	<50	<50
15565447	6/17/2003 17:20	730	180	15	1.7	0.6	0.02	<50	<50
15565447	7/10/2003 18:20	1,000	240	18	1.9	0.6	0.09	<50	<50
15565447	7/24/2003 19:50	900	230	20	2.1	0.5	0.09	<50	<50
15565447 (Set A)	8/19/2003 17:10	890	260	17	2.1	0.6	0.07	<50	<50
15565447 (Set B)	8/19/2003 17:20	890	240	17	2.1	0.6	0.06	<50	<50
15565447	9/23/2003 18:00	800	260	15	1.4	0.5	0.06	<50	<50

**Table 13.** Sediment chemistry data from fixed-station sampling sites in the Yukon River Basin-continued

Station ID	Date/Time	Iron (%)	Manganese (µg/g)	Aluminum (%)	Titanium (%)	Total Organic Carbon (%)	Total Carbon (%)	Total Nitrogen (%)
15356000	5/23/2003 17:40	3.9	970	6.5	0.41	2.1	2.9	0.19
15356000	6/17/2003 12:20	3.8	840	6.6	0.42	0.10	2.4	0.14
15356000 (Set A)	7/17/2003 13:00	4.4	820	7.0	0.53	0.5	2.5	0.04
15356000 (Set B)	7/17/2003 13:10	4.4	800	7.1	0.52	0.5	2.4	0.04
15356000	8/13/2003 13:00	4.5	820	7.1	0.47	0.6	2.3	0.05
15356000	9/9/2003 14:30	3.7	800	6.4	0.45	0.5	2.1	0.09
15356000	9/24/2003 12:30	2.6	590	4.5	0.26	2.3	4.8	0.36
15389000	6/9/2003 15:10	3.9	670	7.3	0.43	3.2	3.4	0.32
15389000	6/19/2003 14:25	2.0	610	3.1	0.23	NR/IS	NR/IS	NR/IS
15389000	7/1/2003 14:30	3.5	1,300	5.5	0.41	NR/IS	NR/IS	NR/IS
15389000	7/23/2003 15:40	4.2	660	7.5	0.47	3.2	3.3	0.32
15389000	8/19/2003 13:10	4.2	710	7.9	0.44	3.6	3.7	0.30
15389000	9/22/2003 13:00	3.0	710	4.1	0.23	5.4	7.4IS	0.47S
15453500	3/26/2003 19:00	4.1	2,200	6.5	0.45	NR/IS	NR/IS	NR/IS
15453500 (Set A)	5/29/2003 16:00	3.6	790	6.4	0.42	2.2	3.2	0.23
15453500 (Set B)	5/29/2003 16:10	3.3	760	6.1	0.38	1.7	2.2	0.15
15453500	6/12/2003 14:20	3.6	750	6.6	0.41	1.5	2.4	0.16
15453500	7/15/2003 16:10	4.6	850	7.3	0.49	0.9	2.5	0.08
15453500	7/24/2003 14:10	4.6	800	7.1	0.49	0.8	2.5	0.06
15453500	8/21/2003 13:30	4.4	810	7.0	0.45	1.0	2.3	0.08
15453500	9/11/2003 16:10	3.5	750	6.4	0.40	1.5	2.3	0.14
15515500	3/14/2003 18:30	5.4	4,000	7.1	0.41	1.1	1.2	0.10
15515500	5/8/2003 14:40	4.1	930	7.1	0.40	0.5	0.7	<0.1
15515500	5/28/2003 15:30	2.9	630	5.8	0.34	0.4	0.5	0.10
15515500	6/11/2003 13:30	4.1	840	7.5	2.30	0.5	0.8	0.10
15515500	7/22/2003 13:30	4.3	720	8.0	0.47	0.4	0.6	0.03
15515500 (Set A)	8/15/2003 11:30	4.7	840	8.6	0.44	0.4	0.4	0.04
15515500 (Set B)	8/15/2003 11:40	4.6	810	8.4	0.43	0.5	0.5	0.03
15515500	9/12/2003 13:40	3.3	670	6.4	0.41	0.4	0.6	0.03

**Table 13.** Sediment chemistry data from fixed-station sampling sites in the Yukon River Basin-continued

Station ID	Date/Time	Iron (%)	Manganese (µg/g)	Aluminum (%)	Titanium (%)	Total Organic Carbon (%)	Total Carbon (%)	Total Nitrogen (%)
15565447	5/28/2003 14:40	4.0	790	7.0	0.42	1.5	1.8	0.14
15565447	6/17/2003 17:20	3.0	680	6.7	0.45	1.4	1.7	0.13
15565447	7/10/2003 18:20	4.9	960	7.9	0.50	1.2	1.9	0.11
15565447	7/24/2003 19:50	5.0	940	8.2	0.48	1.0	1.5	0.08
15565447 (Set A)	8/19/2003 17:10	4.5	850	7.3	0.44	1.2	2.0	0.10
15565447 (Set B)	8/19/2003 17:20	4.6	860	7.3	0.45	1.1	1.9	0.09
15565447	9/23/2003 18:00	3.8	720	6.0	0.35	2.2	2.8	0.25

## **CHAPTER 9 - Sediment Mineralogy**

***by* Dennis D. Eberl**

A description of sample collection and processing of samples for quantitative X-ray mineralogical analysis is given in Schuster (2003). Sample analysis results for WY 2003 are given in table 14.

**Table 14.** Sediment mineralogy data from fixed-station sampling sites in the Yukon River Basin

[Station ID, refer to table 1 for description and figure 1 for location; %, percent; \*, replicate]

<b>Station ID:</b>	<b>15356000</b>	<b>15356000*</b>	<b>15356000</b>
Date	7/17/03	7/17/03	8/13/03
	Weight %	Weight %	Weight %
NON-CLAYS:			
Quartz	15.5	15.1	16.1
ordered Microcline	2.7	2.1	3.1
intermediate Microcline	0.0	0.0	0.0
Sanidine	1.6	1.4	1.5
Orthoclase	0.0	0.0	0.0
Anorthoclase	12.4	11.3	11.2
Albite	6.4	6.1	6.4
Oligoclase	0.0	0.8	0.0
Andesine	2.4	2.1	1.0
Labradorite	6.9	6.1	7.0
Bytownite	1.5	1.1	2.2
Anorthite	0.6	0.9	0.1
Calcite	9.8	9.1	7.7
Mg-calcite	0.7	0.6	1.1
Dolomite	4.7	4.3	3.9
Amphibole	0.9	1.8	1.7
Pyroxene	1.3	1.3	1.0
Magnetite	0.0	0.1	0.0
Hematite	0.6	0.4	0.6
Total non-clays:	68.3	64.7	64.6
CLAYS:			
Goethite	0.3	0.1	0.1
disordered kaolinite	0.2	3.8	0.3
Ferruginous smectite	8.6	10.8	6.3
Illite + smectite	0.0	2.4	6.4
Chlorite	11.6	12.3	12.1
Total Clays:	20.4	29.4	25.1
Total:	88.7	94.1	89.7
Full Pattern degree of fit:	0.079	0.068	0.075
Clay region degree of fit:	0.037	0.044	0.045

**Table 14.** Sediment mineralogy data from fixed-station sampling sites in the Yukon River Basin-continued

<b>Station ID:</b>	<b>15453500</b>	<b>15453500</b>	<b>15453500</b>	<b>15453500</b>
Date	6/12/03	7/15/03	7/24/03	8/21/03
Mineral	Weight %	Weight %	Weight %	Weight %
NON-CLAYS:				
Quartz	33.4	18.8	17.2	19.7
ordered Microcline	2.9	1.9	3.5	1.8
intermediate Microcline	0.0	0.5	0.0	0.0
Sanidine	1.5	2.1	0.8	1.4
Orthoclase	0.0	0.0	0.0	0.0
Anorthoclase	7.5	11.9	14.7	10.5
Albite	4.9	4.9	5.2	5.4
Oligoclase	1.4	1.3	0.0	0.6
Andesine	2.0	1.0	4.6	2.0
Labradorite	5.5	6.1	2.2	4.2
Bytownite	1.1	0.6	0.7	1.7
Anorthite	0.0	1.0	0.6	0.0
Calcite	3.4	7.4	9.7	7.2
Mg-calcite	0.8	0.4	0.4	0.6
Dolomite	3.3	3.5	3.9	3.4
Amphibole	1.1	0.9	1.5	1.0
Pyroxene	0.7	0.9	1.2	0.7
Magnetite	0.0	0.0	0.0	0.0
Hematite	0.5	0.6	0.4	0.4
Total non-clays:	70.0	63.7	67.0	60.7
CLAYS:				
Goethite	0.2	0.0	0.2	0.1
disordered kaolinite	0.0	1.3	0.0	0.7
Ferruginous smectite	3.3	8.6	12.3	4.5
Illite + smectite	8.6	3.3	11.0	11.5
Chlorite	13.2	15.6	7.5	16.5
Total Clays:	25.1	28.8	30.8	33.2
Total:	95.2	92.5	97.8	93.9
Full Pattern degree of fit:	0.082	0.083	0.098	0.069
Clay region degree of fit:	0.038	0.047	0.115	0.043

**Table 14.** Sediment mineralogy data from fixed-station sampling sites in the Yukon River Basin-continued

<b>Station ID:</b>	<b>15515500</b>	<b>15515500</b>	<b>15515500</b>	<b>15515500</b>	<b>15515500</b>
Date	5/8/03	5/28/03	6/11/03	6/17/03	7/22/03
Mineral	Weight %	Weight %	Weight %	Weight %	Weight %
NON-CLAYS:					
Quartz	35.5	45.1	36.7	30.1	30.6
ordered Microcline	1.1	0.9	0.8	2.1	1.0
intermediate Microcline	0.0	0.8	0.0	0.8	0.0
Sanidine	1.5	1.4	1.5	1.6	1.4
Orthoclase	0.0	0.0	0.0	0.0	0.0
Anorthoclase	9.6	9.6	11.0	6.5	11.5
Albite	6.7	8.5	7.0	5.3	6.0
Oligoclase	0.8	1.4	1.0	2.3	0.5
Andesine	2.6	1.7	2.0	1.7	2.7
Labradorite	7.6	6.7	6.7	5.0	5.3
Bytownite	1.7	2.2	1.4	1.5	1.5
Anorthite	0.8	0.0	0.0	0.0	0.0
Calcite	0.5	0.3	0.5	4.5	0.6
Mg-calcite	0.8	0.4	1.0	0.7	0.9
Dolomite	0.6	0.5	0.7	3.7	0.6
Amphibole	1.1	1.2	1.7	1.7	1.5
Pyroxene	1.5	0.8	1.0	0.8	1.6
Magnetite	0.0	0.0	0.0	0.0	0.0
Hematite	0.3	0.2	0.1	0.4	0.1
Total non-clays:	72.9	81.7	73.1	68.6	65.7
CLAYS:					
Goethite	0.0	0.1	0.1	0.0	0.1
disordered kaolinite	0.1	0.0	0.0	4.3	0.0
Ferruginous smectite	4.5	2.9	5.2	4.2	4.1
Illite + smectite	8.9	4.8	7.7	7.1	8.5
Chlorite	14.1	13.1	17.5	11.0	16.4
Total Clays:	27.6	20.8	30.4	26.6	29.0
Total:	100.4	102.5	103.6	95.2	94.7
Full Pattern region degree of fit:	0.092	0.073	0.082	0.068	0.091
Clay region degree of fit:	0.043	0.054	0.046	0.046	0.040

**Table 14.** Sediment mineralogy data from fixed-station sampling sites in the Yukon River Basin-continued

<b>Station ID:</b>	<b>15515500</b>	<b>15515500*</b>	<b>15515500</b>
Date	8/15/03	8/15/03	9/12/03
Mineral	Weight %	Weight %	Weight %
NON-CLAYS:			
Quartz	29.0	30.2	41.9
ordered Microcline	0.9	0.6	1.7
intermediate Microcline	0.0	0.0	0.0
Sanidine	0.0	0.6	0.8
Orthoclase	0.0	0.0	0.0
Anorthoclase	13.3	13.8	13.7
Albite	5.5	5.6	6.9
Oligoclase	0.0	0.3	0.1
Andesine	4.9	5.3	2.6
Labradorite	1.0	1.0	3.2
Bytownite	1.0	0.0	2.1
Anorthite	0.0	0.0	1.1
Calcite	0.5	0.5	0.6
Mg-calcite	1.1	0.8	0.6
Dolomite	0.6	0.6	0.7
Amphibole	2.4	2.1	2.1
Pyroxene	1.6	1.8	0.8
Magnetite	0.0	0.0	0.0
Hematite	0.0	0.0	0.1
Total non-clays:	62.5	63.3	79.4
CLAYS:			
Goethite	0.7	0.2	0.4
disordered kaolinite	0.0	0.0	0.0
Ferruginous smectite	6.5	4.1	3.3
Illite + smectite	17.1	16.2	6.9
Chlorite	13.1	11.9	13.0
Total Clays:	36.7	32.2	23.2
Total:	99.2	95.5	102.6
Full Pattern region degree of fit:	0.101	0.104	0.085
Clay region degree of fit:	0.077	0.075	0.044



**Table 14.** Sediment mineralogy data from fixed-station sampling sites in the Yukon River Basin-continued

<b>Station ID:</b>	<b>15565447</b>	<b>15565447</b>	<b>15565447</b>	<b>15565447</b>	<b>15565447</b>	<b>15565447*</b>
Date	5/28/03	6/17/03	7/10/03	7/24/03	8/19/03	8/19/03
Mineral	Weight %	Weight %	Weight %	Weight %	Weight %	Weight %
NON-CLAYS:						
Quartz	32.8	42.6	23.7	22.0	21.4	22.5
ordered Microcline	0.7	1.1	1.2	1.3	1.3	1.1
intermediate Microcline	0.0	0.0	0.0	0.0	0.0	0.0
Sanidine	1.5	1.1	1.8	1.9	1.3	1.1
Orthoclase	0.0	0.0	0.0	0.0	0.0	0.0
Anorthoclase	10.1	7.7	11.3	11.4	10.3	10.2
Albite	4.8	4.5	4.3	3.9	3.6	4.9
Oligoclase	2.4	0.6	2.4	2.0	2.3	1.3
Andesine	2.4	0.2	0.1	1.0	1.9	2.1
Labradorite	2.9	0.0	4.7	5.6	4.1	4.0
Bytownite	0.0	0.0	0.5	0.4	0.1	0.7
Anorthite	0.0	0.0	0.0	0.0	0.6	0.0
Calcite	0.0	0.0	2.0	2.7	4.5	3.8
Mg-calcite	0.7	0.7	0.9	1.2	1.0	0.8
Dolomite	1.6	0.9	2.2	1.9	2.5	2.4
Amphibole	1.3	0.0	1.1	1.6	0.7	0.9
Pyroxene	0.5	0.5	0.7	0.6	0.7	1.0
Magnetite	0.1	0.0	0.0	0.0	0.0	0.0
Hematite	0.2	0.0	0.3	0.3	0.4	0.3
Total non-clays:	62.0	60.5	57.3	57.6	56.6	57.3
CLAYS:						
Goethite	0.0	0.6	0.0	0.0	0.0	0.0
disordered kaolinite	1.2	0.0	0.0	0.0	0.0	1.4
Ferruginous smectite	6.1	2.0	8.4	7.1	7.1	5.7
Illite + smectite	7.9	16.1	9.2	12.3	11.4	11.0
Chlorite	17.1	21.1	18.3	18.1	17.1	17.6
Total Clays:	32.3	39.2	35.9	37.6	35.7	35.8
Total:	94.4	99.7	93.2	95.1	92.2	93.1
Full Pattern region degree of fit:	0.094	0.088	0.090	0.094	0.079	0.081
Clay region degree of fit:	0.045	0.041	0.046	0.041	0.037	0.043

## **CHAPTER 10 - Sediment Concentration and Percent Organic Matter (OM)**

***by Paul F. Schuster and Michael M. Reddy***

A description of sample collection and processing of samples for suspended sediment concentration and percent OM in the sediment is given in Schuster (2003). Sample analysis results for WY 2003 are given in table 15.

**Table 15.** Suspended sediment concentrations and percent organic matter in sediment from fixed-station sampling sites in the Yukon River Basin

[Station ID, refer to table 1 for description and figure 1 for location; mg/L, milligram per liter; OM, Organic Matter; NA, not available; <, less than]

Station ID	Date	Sediment concentration (mg/L)	Percent OM in sediment
15356000	4/1/2003	<1	NA
15356000	5/23/2003	30	18
15356000	6/17/2003	147	11
15356000	7/17/2003	559	9
15356000	8/13/2003	209	11
15356000	9/9/2003	47	13
15356000	9/24/2003	14	18
15389000	4/4/2003	<1	NA
15389000	6/9/2003	56	16
15389000	6/19/2003	8	41
15389000	7/1/2003	4	60
15389000	7/23/2003	32	20
15389000	8/19/2003	31	20
15389000	9/22/2003	6	43
15453500	3/26/2003	11	17
15453500	5/29/2003	54	11
15453500	6/12/2003	43	21
15453500	7/15/2003	159	12
15453500	7/24/2003	384	12
15453500	8/21/2003	155	13
15453500	9/11/2003	51	11
15515500	3/19/2003	15	14
15515500	5/8/2003	209	6
15515500	5/28/2003	109	6
15515500	7/22/2003	1,271	6
15515500	8/15/2003	1,815	5
15515500	9/12/2003	313	4
15565447	3/25/2003	4	60
15565447	5/28/2003	71	11
15565447	6/17/2003	113	13
15565447	7/10/2003	210	13
15565447	7/24/2003	242	12
15565447	8/19/2003	194	10
15565447	9/23/2003	55	17

## **CHAPTER 11 – Particulate Carbon (PC) and Particulate Nitrogen (PN)**

***by Paul F. Schuster and Michael M. Reddy***

A description of sample collection and processing of samples for PC and PN concentrations is given in Schuster (2003). Sample analysis results for WY 2003 are given in table 16.

**Table 16.** Particulate carbon and particulate nitrogen concentrations from fixed-station sampling sites in the Yukon River Basin

[Station ID, refer to table 1 for description and figure 1 for location; PC, particulate carbon; PN, particulate nitrogen; mg/L, milligram per liter; < less than; concentrations averaged from duplicate samples]

Station ID	Date	PC (mg/L)	PN (mg/L)
15356000	4/1/2003	<0.06	<0.01
15356000	5/23/2003	1.34	0.08
15356000	6/17/2003	3.81	0.15
15356000	7/17/2003	19.20	0.35
15356000	8/13/2003	6.54	0.14
15356000	9/9/2003	1.93	0.07
15356000	9/24/2003	0.74	0.03
15389000	4/4/2003	<0.06	<0.01
15389000	6/9/2003	2.73	0.22
15389000	6/19/2003	0.51	0.06
15389000	7/1/2003	0.39	0.05
15389000	7/23/2003	1.04	0.10
15389000	8/19/2003	1.65	0.14
15389000	9/22/2003	0.38	0.04
15453500	3/26/2003	0.31	0.02
15453500	5/29/2003	2.70	0.17
15453500	6/12/2003	1.05	0.09
15453500	7/15/2003	4.56	0.16
15453500	7/24/2003	13.00	0.33
15453500	8/21/2003	5.76	0.17
15453500	9/11/2003	2.29	0.14
15515500	3/19/2003	0.38	0.02
15515500	5/8/2003	4.27	0.29
15515500	5/28/2003	1.41	0.09
15515500	7/22/2003	8.50	0.37
15515500	8/15/2003	17.60	0.88
15515500	9/12/2003	2.44	0.12
15565447	3/25/2003	0.40	0.04
15565447	5/28/2003	2.21	0.17
15565447	6/17/2003	5.97	0.39
15565447	7/10/2003	3.53	0.20
15565447	7/24/2003	5.20	0.27
15565447	8/19/2003	4.39	0.20
15565447	9/23/2003	2.31	0.14

## **CHAPTER 12 - Isotopic Analysis of Suspended Particulate Organic Matter (POM)**

***by* Steven R. Silva and Carol Kendall**

A description of sample collection and processing of samples for the percent of carbon and nitrogen, carbon:nitrogen ratios, carbon-13, and nitrogen-15 isotopes in suspended POM is given in Schuster (2003). Sample analysis results for WY 2003 are given in table 17.

**Table 17.** Suspended sediment isotopic data from fixed-station sampling sites in the Yukon River Basin

[Station ID, refer to table 1 for description and figure 1 for location; C, carbon; N, nitrogen; SD, standard deviation; Avg, average; %, percent;  $\delta$ , delta; --, no data; \*, replicate]

Station ID	Date	Avg %C	SD %C	Avg %N	SD %N	C:N	Avg $\delta^{13}\text{C}$	SD $\delta^{13}\text{C}$	Avg $\delta^{15}\text{N}$	SD $\delta^{15}\text{N}$
15356000	5/23/2003	0.45	--	0.04	--	13.78	-26.98	--	3.16	--
15356000	6/17/2003	1.68	--	0.08	--	25.28	-16.39	--	1.94	--
15356000	7/17/2003	0.42	--	0.04	--	13.81	-24.60	--	2.00	--
15356000	7/17/2003	0.50	--	0.04	--	14.45	-24.43	--	1.78	--
15356000	9/9/2003	0.85	--	0.07	--	14.29	-20.45	--	2.56	--
15356000	9/24/2003	0.29	--	0.03	--	12.88	-26.38	--	2.62	--
15565447	5/26/2003	0.51	--	0.06	--	9.66	-26.74	--	-4.11	--
15565447	5/28/2003	1.49	--	0.11	--	16.46	-26.07	--	1.77	--
15565447	5/28/2003*	0.45	--	0.06	--	8.65	-25.92	--	0.23	--
15565447	6/15/2003	0.63	--	0.06	--	12.43	-26.67	--	2.45	--
15565447	6/15/2003*	0.44	--	0.06	--	7.99	-25.44	--	--	--
15565447	6/17/2003	1.36	--	0.09	--	17.49	-25.21	--	1.64	--
15565447	6/17/2003*	0.48	--	0.06	--	9.74	-26.38	--	1.65	--
15565447	7/10/2003	1.21	--	0.10	--	13.72	-26.84	--	2.49	--
15565447	7/10/2003*	0.55	--	0.11	--	6.02	-22.49	--	5.43	--
15565447	7/24/2003	0.99	--	0.07	--	15.36	-26.00	--	1.90	--
15565447	7/24/2003*	0.46	--	0.04	--	13.73	-26.69	--	--	--
15565447	8/19/2003	1.09	--	0.08	--	16.84	-26.38	--	2.62	--
15565447	8/19/2003*	1.08	--	0.07	--	17.26	-26.27	--	2.95	--
15453500	5/29/2003	1.68	--	0.11	--	17.33	-22.11	--	2.20	--
15453500	6/12/2003	1.97	--	0.10	--	23.23	-19.57	--	1.14	--
15453500	7/15/2003	0.88	--	0.05	--	18.90	-24.50	--	2.03	--
15453500	7/24/2003	0.86	--	0.05	--	19.50	-23.27	--	2.71	--
15453500	8/21/2003	0.91	--	0.07	--	15.84	-26.11	--	1.86	--
15453500	9/11/2003	0.98	--	0.09	--	13.14	-26.02	--	2.56	--
15453500	9/11/2003	1.22	0.17	0.10	0.01	13.85	-25.53	0.35	3.21	0.46
15515500	3/19/2003	0.96	--	0.08	--	14.48	-28.22	--	4.79	--
15515500	5/8/2003	0.58	--	0.04	--	17.58	-25.25	--	2.09	--
15515500	5/28/2003	0.21	--	0.01	--	17.39	-25.17	--	4.13	--
15515500	6/11/2003	0.51	--	0.03	--	21.50	-25.24	--	1.86	--
15515500	7/22/2003	0.46	--	0.03	--	20.04	-25.11	--	1.47	--
15515500	8/15/2003	0.46	--	0.02	--	21.68	-24.58	--	1.14	--
15515500	8/15/2003	0.40	--	0.02	--	19.57	-23.70	--	1.88	--
15515500	9/12/2003	0.32	--	0.02	--	19.29	-25.48	--	1.64	--
15389000	6/9/2003	3.52	--	0.25	--	16.59	-26.51	--	1.67	--
15389000	6/9/2003*	3.31	0.15	0.26	0.01	15.00	-27.01	0.36	2.59	0.66
15389000	6/19/2003	0.42	--	0.04	--	11.61	-29.28	--	4.16	--
15389000	7/1/2003	0.48	--	0.06	--	10.08	-30.77	--	2.73	--
15389000	7/23/2003	3.17	--	0.30	--	12.49	-27.44	--	2.52	--
15389000	8/19/2003	3.23	--	0.21	--	17.75	-27.60	--	2.28	--
15389000	8/19/2003*	3.36	0.09	0.23	0.01	17.37	-27.59	0.00	2.08	0.14
15389000	9/22/2003	0.32	--	0.03	--	13.93	-27.18	--	4.23	--

## **CHAPTER 13 - Uranium Isotopes**

***by* Thomas F. Kraemer**

A description of sample collection and processing of samples for uranium concentrations and activity ratios (UAR) is given in Schuster (2003). Sample analysis results for WY 2003 are given in table 18.



**Table 18.** Uranium concentration and  $^{234}\text{U}/^{238}\text{U}$  isotopic activity ratio analyses in water samples from fixed-station sampling sites in the Yukon River Basin

[Station ID, refer to table 1 for description and figure 1 for location;  $\mu\text{g/L}$ ; microgram per liter; U, Uranium; --, not available]

Station ID	Date and time		U ( $\mu\text{g/L}$ )	$^{234}\text{U}/^{238}\text{U}$ activity ratio ( $\pm 1$ sigma uncertainty)
15389000	04/04/03	1830	0.90	2.551 $\pm$ 0.019
15389000	06/09/03	1510	0.24	1.745 $\pm$ 0.017
15389000	06/19/03	1420	0.45	1.956 $\pm$ 0.011
15389000	07/01/03	1430	0.42	1.964 $\pm$ 0.018
15389000	07/23/03	1540	0.29	1.886 $\pm$ 0.019
15389000	08/19/03	--	0.27	1.859 $\pm$ 0.011
15389000	09/22/03	1300	0.47	1.944 $\pm$ 0.011
15515500	03/19/03	1830	0.88	1.355 $\pm$ 0.013
15515500	05/08/03	1440	0.84	1.301 $\pm$ 0.027
15515500	05/28/03	1530	0.90	1.342 $\pm$ 0.015
15515500	06/11/03	1330	0.99	1.249 $\pm$ 0.015
15515500	07/22/03	1330	0.98	1.158 $\pm$ 0.011
15515500	08/15/03	1130	1.13	1.090 $\pm$ 0.013
15515500	09/12/03	1340	0.82	1.261 $\pm$ 0.017
15356000	04/01/03	1050	1.25	1.420 $\pm$ 0.009
15356000	05/23/03	1740	0.98	1.562 $\pm$ 0.020
15356000	06/17/03	1220	0.81	1.453 $\pm$ 0.005
15356000	07/17/03	1300	0.93	1.463 $\pm$ 0.015
15356000	08/13/03	1300	0.98	1.404 $\pm$ 0.014
15356000	09/09/03	1430	1.00	1.456 $\pm$ 0.009
15356000	09/24/03	1230	1.03	1.438 $\pm$ 0.008
15565447	03/25/03	1900	0.97	1.438 $\pm$ 0.013
15565447	05/28/03	1440	0.53	1.474 $\pm$ 0.008
15565447	06/17/03	1720	0.49	1.467 $\pm$ 0.008
15565447	07/10/03	1820	0.73	1.404 $\pm$ 0.026
15565447	07/24/03	1950	0.82	1.407 $\pm$ 0.033
15565447	08/19/03	1710	0.73	1.385 $\pm$ 0.023
15565447	09/23/03	1800	0.71	1.431 $\pm$ 0.011
15453500	03/26/03	1900	1.18	1.474 $\pm$ 0.012
15453500	05/29/03	1600	0.64	1.599 $\pm$ 0.015
15453500	06/12/03	1420	0.66	1.512 $\pm$ 0.019
15453500	07/15/03	1600	0.88	1.491 $\pm$ 0.014
15453500	07/24/03	1410	0.78	1.485 $\pm$ 0.012
15453500	08/21/03	1330	0.74	1.517 $\pm$ 0.036
15453500	09/11/03	1610	0.72	1.549 $\pm$ 0.026

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